ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

Gr w-Hill Co.
of alifornia

NOVEMBER, 1942

25c a Copy

We know it's tough but it's got to be done

You've made a career of selling light. You've sold your customers—stores, theaters, service stations and other commercial places—on the advantages of adequate display lighting. And your territory, Central and Southern California, became the most brightly lighted section of its size in the country.

Now your job is to go right back to those same customers and help dim their lights.

It's the War! And it's our job to help win it in every way we can.

Here's one way we—you the distributor, dealer and contractor and we the Southern California Edison Company—can help. If you need any technical assistance, our engineers, who know the extent as well as the limitations of the dimout regulations, are ready at your call.

SOUTHERN CALIFORNIA Edison EDISON COMPANY LTD.

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TO THE HUNDREDS OF NEW USERS OF PYRANOL TRANSFORMERS

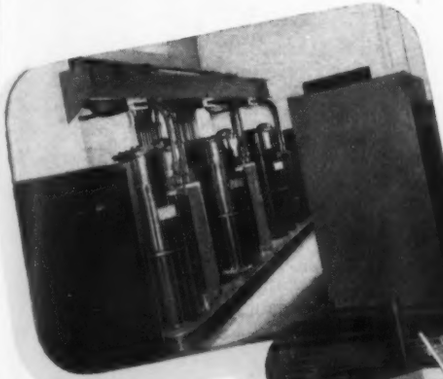
These 635-kva Pyranol transformers supply power to resistance-welding machines in the middle of a production area.

By installing Pyranol transformers (instead of making a conventional transformer installation) you made big savings in materials and over-all installed cost.

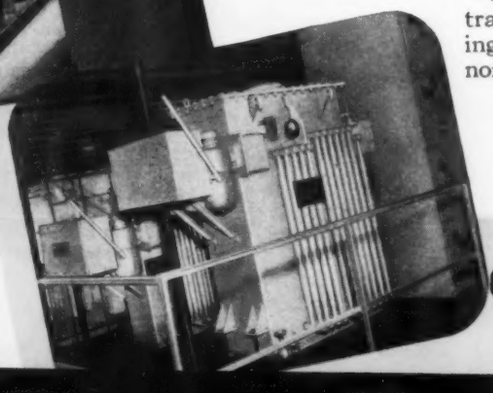
You reduced installation time and cost, because you could install these transformers indoors without a fireproof vault.

You saved copper—many tons of it if your plant is a large one—because you could install these transformers right at load centers, where transformers were meant to be installed.

You reduced line losses and voltage drop in your plant circuits and assured better performance from motors, resistance-heating equipment, lamps, and other electric equipment.



Vaultless installation of these 225-kva Pyranol transformers in a steel-mill motor room meant savings in materials plus economical power distribution.



These G-E load-center unit substations, incorporating Pyranol transformers, are part of a G-E load-center power-distribution system in an expanding war plant.

Safety of Pyranol—an Asset to Your Plant

Since the introduction of Pyranol in 1932, more than 4,000,000 kva of new transformers have been furnished with this type of noninflammable insulating and cooling liquid. No Pyranol transformer, in 10 years of operating experience, has burned or contributed to a fire.

Greater Reliability—a Continuing Benefit

The high dielectric strength of Pyranol means extra stamina to resist damage from voltage surges resulting from switching operations or lightning. This is a safeguard against progressive deterioration of the insulation that might otherwise result in a transformer breakdown and loss of power service.

Pyranol transformers have other features that mean greater reliability and little maintenance. The pressure-tight steel tank protects both liquid and solid insulation—keeps out dust, dirt, moisture, and other enemies of transformer life. Pyranol is nonoxidizing and nonsludging. It will retain its insulating properties over years of normal operation. *General Electric, Schenectady, N. Y.*

The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment.

GENERAL ELECTRIC

402-61-5100

Here in the WEST

NOVEMBER, 1942 VOL. 89, NO. 5

People

Lee F. Adams

who tells how motors may be selected to load copper to the limit and thus conserve its use (p. 62) first gave this paper to both Northwestern and Southwestern Sections, IAEI. He is assistant to the vice-president, General Electric Co., Schenectady, and NEMA member on the Electrical Committee that makes the National Electrical Code, as well as on the Emergency Committee. For several years he has come West to IAEI meetings.

N. W. Humphrey

who tells how old penstock was salvaged for emergency replacement by Washington Water Power Co. (p. 42) received his mechanical engineering degree from Washington State College in 1916. Since then he has had a varied and valuable experience. For five years he was employed by Allis-Chalmers, specializing in pump design, and has several patents to his credit. Later he spent several years with mechanical and electrical jobbing concerns and with the Union Iron Works of Spokane, a large custom shop where he was engaged in design. For the past 13 years he has been with Washington Water Power in the construction department. Though he presents a serious mien to the camera, he approaches his work with a sense of humor. On this penstock job, he says that the packing house which uses everything but the squeal of the pig has nothing on him. He used practically everything but rivet holes.

Pages

Thrice Armed 35
How one company equips its men in the armed forces to combat worry about families at home.

Wartime Housekeeping 39
By EARL M. SEEL—Substitution and salvage save critical materials, preserve service efficiency for Pacific Gas and Electric Co.

Manpower and Materials 45
PCEA discusses ways and means of getting along under today's restrictions at Fresno.

Make Copper Work Harder 62
By LEE F. ADAMS—Select motors for maximum load, make controllers take more; get maximum use from distribution wiring.

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Cover photo: Clouds form an evanescent counterpart of the circuit breaker in this picture taken by J. F. Sinnott of San Diego Gas & Electric Co.

Preview

Humans

are the one part of a business that have had no research to find out what will make them "job-happy" and less alergic to political panaceas and organized quackery, the PCEA conclave at Fresno was told by Hugo Bedau. His stimulating paper will be digested in the next issue to bring to all who could not be there to hear him a new point of view on personnel. Those who did hear him have all asked for copies of his address and this will be his means of fulfilling all these requests. It is important and revealing.

Synthetic Rubber

was discussed by a chap who knows the full stretch of the subject at the same conclave, Donald Jenkins of Westinghouse. Because the subject is so vital not only to individuals from a mobile standpoint, but to the industry for many uses, his paper will be published next month.

Food Is Power

Miss Nancy Finch of Utah Power & Light told business men in a number of knife and fork clubs recently. What she told them was so pointed (at the stomach) it will do all male readers good to get her remarks in the next issue.

Bus Distribution

is proving itself a compact, flexible and salvagable wiring method for many a war plant these days. While little can be told of war plants, the way this bus is designed, assembled and what it does can and will be told next month. In fact the December number will be crammed with valuable and timely material.

"This is only the first lap . . .

. . . the first lap of a race to produce enough war material to destroy our enemies before they destroy us. Until the race is won, our job is to keep turning out more and more electrical cables for the war effort. It is the job for which we are best equipped. And we're making every minute count."

Employees of Hazard Insulated Wire Works

The Army-Navy "E" pennant we proudly fly tells the world that our plants are running day and night to meet the demands of our armed forces for insulated wires and cables. It means, too, that we cannot always fulfill the needs of our other customers on time—yet we are doing everything in our power to help them. But winning the war *must* come first.

3145

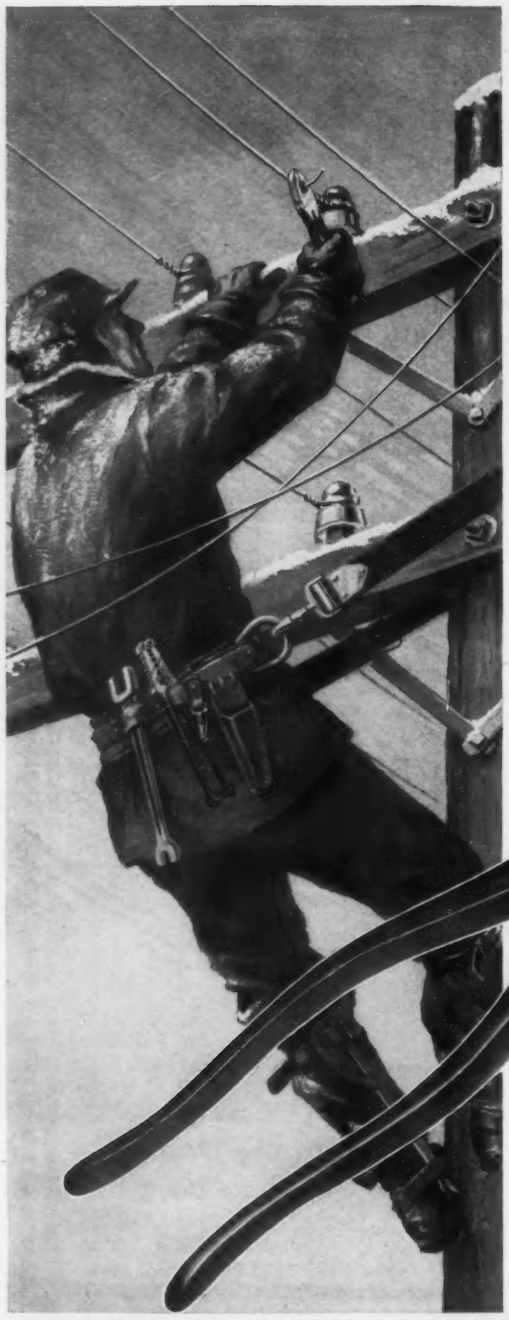
HAZARD INSULATED WIRE WORKS

DIVISION OF THE OKONITE COMPANY

Wilkes-Barre, Pennsylvania — Offices in Principal Cities

BUY U. S. WAR BONDS—Every Payday All Hazard Employees BUY U. S. WAR BONDS

A STURDY TOOL FOR TOUGH JOBS —KLEINS!



War-time emergency means messages must go through. Power service cannot be interrupted either if vital war industries are to produce to capacity. There's no time to wait for skies to clear or the mercury to rise —no matter how tough the job. The man on the pole who keeps the lines open knows the tools he uses have to be tough, too. That's why you will find the Klein name on his pliers and wrenches, on his safety strap and belt. He knows it stands for equipment that he can rely on.

Your copy of the Klein Pocket Tool Guide will be sent on request

ASK YOUR SUPPLIER

Foreign Distributor:

International Standard Electric Corp., New York

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO

Letters To The Editor

Editor ELECTRICAL WEST:

A very serious crime has been committed. There has been skull-duggery in the North 40. If you will look at Page 65 of the October issue of ELECTRICAL WEST, you will note the statement "B. DeM. Mertens, Vancouver, won the Fisken cup for the third time, taking it permanently."

That is definitely untrue for the reason that this is the first time that Mr. Mertens has ever won the jolly sterling beaker and it is only the second time that it has left the environs of these U.S.A.* Mr. Mertens will have to arrange to deliver this said John B. Fisken cup to the next Pacific Coast AIEE convention. I ought to know as I won the cup via the 1941 Yellowstone convention.

I am sorry that somebody gave you this phony information. Perhaps you better write Mr. Mertens so that he won't have any false hopes.

C. H. CUTTER,
Pacific Electric Mfg. Corp.
Seattle

*Here is the list of winners:

1920—Carl L. Wernicke	Portland
1921—Chas. P. Osborne	Portland
1922—John B. Fisken	Spokane
1923—Sylvan J. Lisberger	San Francisco
1924—Karl E. Van Kuran	Los Angeles
1925—Walter C. Heston	San Francisco
1926—Paul M. Downing	San Francisco
1927—Chas. E. Heath	Los Angeles
1928—George D. Luther	Seattle
1929—E. W. Rockwell	Los Angeles
1930—W. F. Hynes	Portland
1931—M. S. Barnes	San Francisco
1932—J. E. Underhill	Vancouver, B. C.
1934—H. W. Flye	Salt Lake City
1935—H. H. Schoolfield	Portland
1936—J. C. Henkle	Portland
1937—R. H. Dearborn	Corvallis
1938—T. S. Wood	Seattle
1939—W. G. B. Euler	San Francisco
1940—Chas. Croft	Los Angeles
1941—C. H. Cutter	Seattle
1942—B. DeM. Mertens	Vancouver, B. C.

Books You May Want

CABLE OPERATION, 1940, Edison Electric Institute, 420 Lexington Ave., N. Y., 21 pages, 8¼ x 11½, 50c (members) $1.25 (non-members in U.S.A.). A joint report of the Committee on Power Distribution, Association of Edison Illuminating Companies and the EEI Distribution Committee, this report combines the essential features of the annual cable operation reports which in previous years have been prepared separately by the AEIC and EEI committees. Although there is a reduction in the number of contributors, the amount of equipment reported has been reduced only about 10%. Study of the causes of cable troubles has been expanded to cover all troubles reported.

HANDBOOK OF SHIP CALCULATIONS, CONSTRUCTION AND OPERATION (third edition), by Charles H. Hughes, 5 x 7, 558 pages, McGraw-Hill Book Co., $5. This handbook is designed for men engaged in designing, building and operating ships and data is compiled for convenient reference. Included are sections on hull construction; machinery; electricity; heating, ventilation, refrigeration and air conditioning.

Ideas that dare are the Ideas that lead

You never could keep out front by doing "business as usual." This is truer today than ever before. War production calls for daring new ideas, daring new methods.

But to be successful, pioneering must be done with judicious daring—not reckless abandon.

The ability of Shell men to see the *entire* picture, to fit the use of lubricants to the task of greater production, by attacking a problem at its source rather than in its narrow relation to lubrication alone, has won the confidence of busy production executives. Their practical pioneering is saving time, improving products or services, lengthening machine and tool life for industry across the nation.

Are your lubricants tuned to the increased tempo of today's machines? Call Shell and be sure!

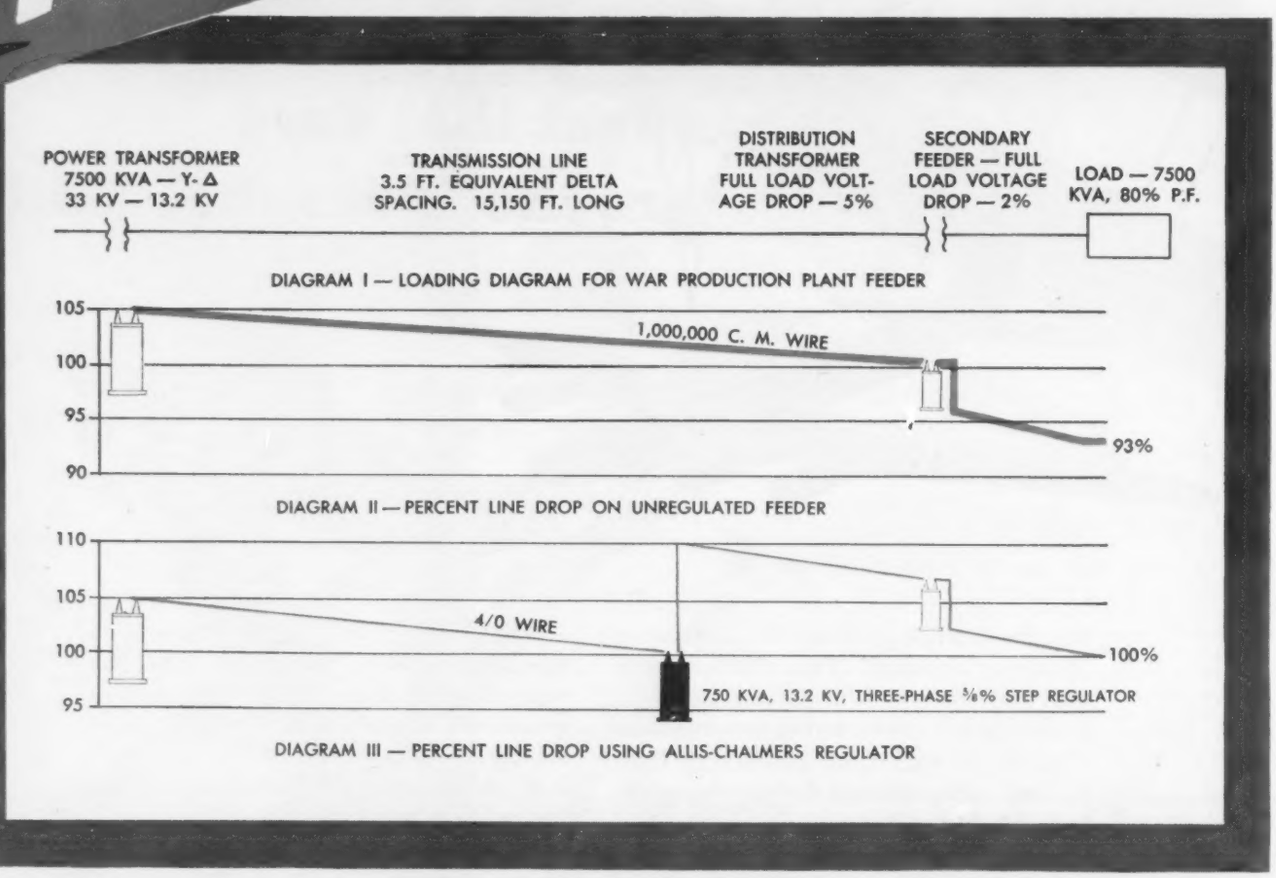
SHELL *INDUSTRIAL LUBRICANTS*

★ ★ ★ ★ ★

OIL IS *Ammunition* - USE IT WISELY

SHELL

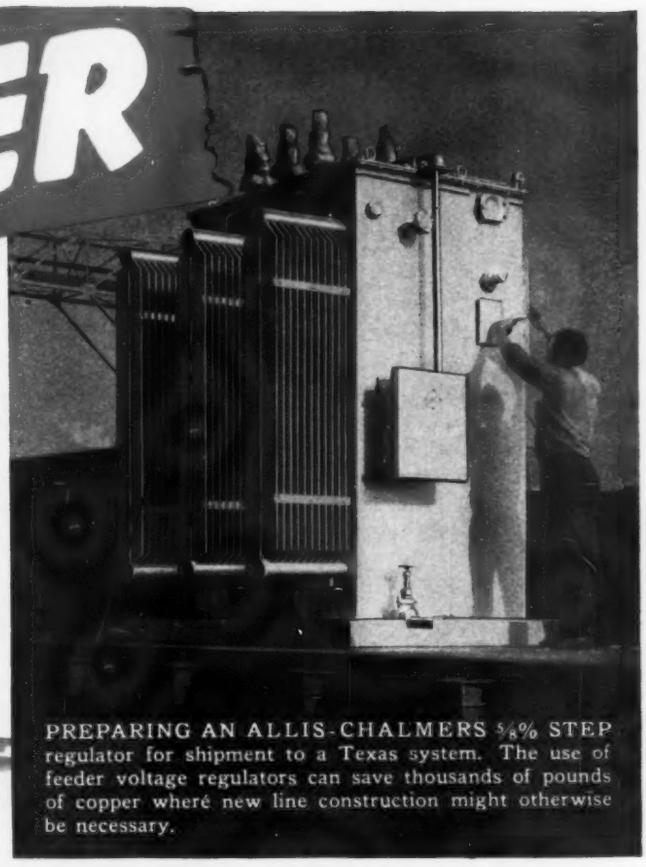
SAVED... 108,000 POUNDS



ALLIS-CHALMERS 5/8%

OF COPPER

. . . Enough for More Than 100 Bombers!



PREPARING AN ALLIS-CHALMERS 5/8% STEP regulator for shipment to a Texas system. The use of feeder voltage regulators can save thousands of pounds of copper where new line construction might otherwise be necessary.

Allis-Chalmers 5/8% Step Feeder Voltage Regulator at New War Production Plant Releases Thousands of Pounds of Vital Metal . . . Slashes Man-Hours Required to Build New Line.

108,000 POUNDS OF COPPER — enough for more than 100 bombers! That's how much of this vital metal was saved in the building of the feeder to a new war production plant . . . by using an Allis-Chalmers 5/8% Step Feeder Voltage Regulator.

The problem (shown in Diagram I) was to construct a transmission line from the power transformer to the load using the minimum amount of copper to keep the voltage within the allowable limits.

To maintain the voltage on an unregulated line would have required 1,000,000 c.m. wire — a total of 140,400 pounds of copper (Diagram II). And voltage would have varied from 105% at no load to 93% at full load.

On the other hand, with a 750 kva, three-phase Allis-Chalmers 5/8% Step Regulator on the line, it was possible to reduce the wire size and keep the voltage within 1% of normal at all times (Diagram III).

Actually this wiring plan required only 29,700 pounds of copper (plus 2,000 pounds in the regulator) — *a saving of 108,700 pounds.* What's more, the man-hours required to construct the line were drastically reduced. Poles and hardware could be much lighter.

This is a typical example of the savings in war-vital material that feeder voltage regulators can mean on both new and over-loaded lines. Listed at right are five other reasons why engineers choose Allis-Chalmers 5/8% Step Regulators.

For complete information on one thing you can do to aid the nation's War Effort, call the district office near you. Or write to Allis-Chalmers, Milwaukee, for your copy of Bulletin B6056A.

A 1556

Reasons Why Engineers Choose Allis-Chalmers 5/8% Step Regulators

1. Closer Regulation! 3/8% half-cycling steps plus "Feather-Touch Control" permit band width settings within ± 3/8% of 1%.

2. Longer Contact Life! Not a single contact has ever been replaced on an Allis-Chalmers Regulator due to deterioration under normal operation.

3. Lower Exciting Current! Need only 1/8 the exciting kva required by older types of regulators.

4. Increased Dielectric Strength! Unit construction eliminates 78 bolted connections between compartments.

5. Minimum Maintenance! No holding or braking devices. Complete oil-immersion of all moving parts means there's nothing to lubricate.

STEP REGULATORS

WE WORK FOR VICTORY WE PLAN FOR PEACE

How The Lighting Industry is Meeting a Challenge!

THE lighting industry today is meeting the challenge of increasing night production to the level of daytime production. In many converted war plants, here is what happens on the "after dark" shift:

1. *Rejects are higher.*
2. *More material is wasted.*
3. *Fatigue increases faster.*
4. *Accidents are more numerous.*
5. *Quality of work is poorer.*
6. *The production rate is lower.*
7. *The number of employees who fail to show up for work is larger.*

Basically, in practically every plant where these things occur, the cause is poor lighting. Whereas day shifts enjoy the benefits of both daylight and artificial illumination, after-dark shifts depend on artificial lighting alone . . . and in most converted war plants, the existing lighting systems were designed primarily to supplement daylight. They were not meant to provide the necessary seeing light for the type of prolonged work that now goes on all through the dark hours.

GLARE

WHAT'S WRONG WITH THE LIGHTING?

In plants where lighting surveys have been made, three types of "lighting bottlenecks" are most prevalent:

1. Glare is one of the most frequent difficulties. Often it is even worse at night because contrasts are greater.

2. Shadows are another bad offender . . . shadows that hide details, create false conclusions, and conceal hazardous conditions.

3. Insufficient light the third trouble, is frequently caused by improperly placed lighting fixtures, by dirt and dust on lamps and fixtures that reduce their efficiency as much as 50%, or by use of wrong size lamps.

SHADOWS

WHAT CAN BE DONE ABOUT IT? Many of these converted plants realize their lighting is inadequate but don't realize how simply and inexpensively it can be improved. Many of them are amazed when lighting men show them how even a few simple changes (see box) provide the better light they needed.

To increase the production ratio on night shifts is, in effect, the equivalent of putting more factories to work to speed the war effort . . . and at infinitely less cost.

INSUFFICIENT LIGHT

The lighting industry is meeting this challenge to help end the war sooner by breaking many of the production bottlenecks caused by poor lighting.

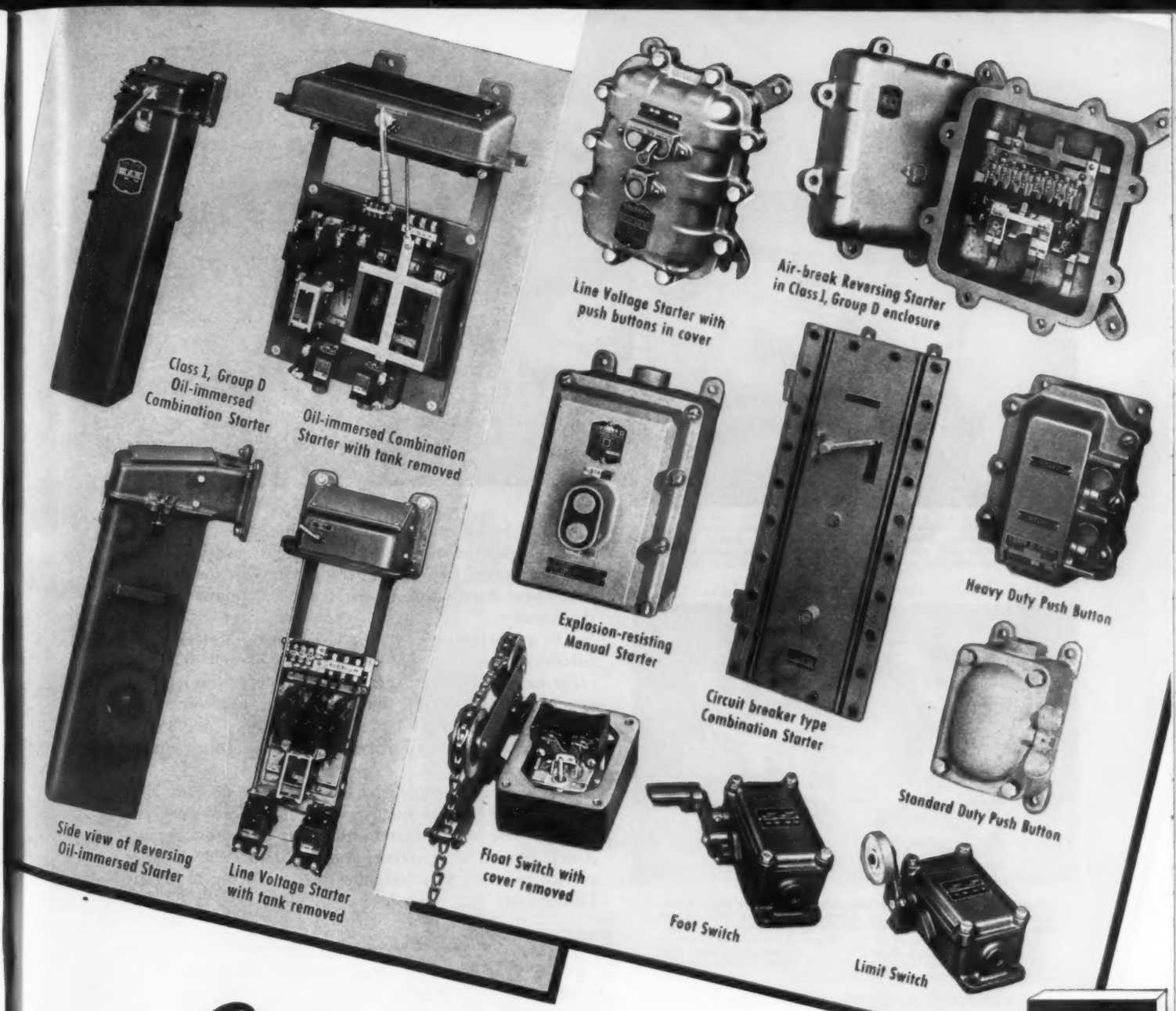
Toward this end, General Electric lighting men gladly pledge their time, skill, and experience . . . remembering that their job is *not to sell, but to serve.* General Electric Company, Nela Park, Cleveland, Ohio.

SIMPLE THINGS LIKE THESE ARE INCREASING LIGHTING EFFICIENCY. . . STEPPING UP NIGHT SHIFT PRODUCTION!

1. Have a regular cleaning schedule for bulbs and fixtures.
2. Make sure right size bulbs are used in present fixtures.
3. Relocate present lighting to fit new demands.
4. Add supplementary lighting for the most critical seeing operations, such as inspections.
5. Re-paint walls a light color to reduce light absorption; paint machinery a light color to increase visibility.
6. Make frequent light meter checks on maintenance.
7. Recommend new lighting equipment *only* when it is essential.

G-E MAZDA LAMPS

GENERAL ELECTRIC


Class 1, Group D Oil-immersed Combination Starter
Oil-immersed Combination Starter with tank removed
Line Voltage Starter with push buttons in cover
Air-break Reversing Starter in Class 1, Group D enclosure
Explosion-resisting Manual Starter
Circuit breaker type Combination Starter
Heavy Duty Push Button
Standard Duty Push Button
Side view of Reversing Oil-immersed Starter
Line Voltage Starter with tank removed
Float Switch with cover removed
Foot Switch
Limit Switch

2 Complete Lines of Motor Control

FOR CLASS 1, GROUP D HAZARDOUS GAS LOCATIONS

In plants handling explosives, making rubber, refining petroleum, or doing any one of a hundred other vital jobs, much of the electric motor control must be installed in hazardous locations.

Square D meets today's heavy demands for such installations with two unusually complete lines of Class 1, Group D equipment.

★ ★ ★

AIR BREAK explosion-resisting equipment embodies standard Square D motor control devices mounted in heavy, ribbed, cast iron enclosures. Vertical action starters with double-break silver contacts provide trouble-free operation, complete accessibility, and low maintenance expense.

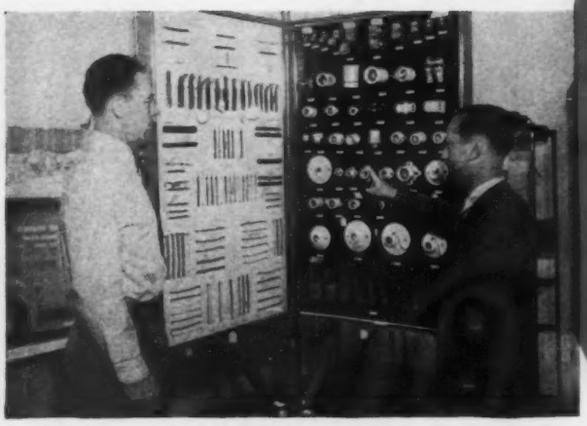
OIL-IMMERSED starters feature easy installation and servicing. Cast iron head has wiring manifold which permits conduit entrance from five directions. Removable cover plate facilitates wiring. Track-type guides prevent swinging or splashing in the process of raising or lowering tank.

SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

KOLLSMAN INSTRUMENT DIVISION, ELMHURST, NEW YORK

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO



W. L. Duncan (right), branch manager, General Electric Supply Corporation, Fresno, Calif., and W. P. Jones, branch service supervisor are selecting wiring devices from sample board to recommend to customer handling a rush war job.

Henry Oestreich (left), superintendent of the Black Hills Power and Light Company in Provo, South Dakota field office in discussing materials suitable for important job with F. E. Neuberger, salesman, General Electric Supply Corporation, Denver, Colo., covering western Nebraska and southwestern South Dakota territory. At far right, Miss Nellie Hubbard, stenographer for Black Hills Power and Light Company.

S. J. Marra (left), and W. F. Ford, General Electric Supply Corporation, Oakland, Calif., are here discussing switches to be recommended for a war job. Mr. Ford was scheduled to leave shortly after this picture was taken to join the U. S. armed forces.

For War Project Wiring Supplies

See Your Neighbor

THE G-E WIRING MATERIALS DISTRIBUTOR

Conduits, boxes and fittings, wire and cable and wiring devices — all the materials you need for war jobs — are handled by the G-E Wiring Materials Distributor near you. These distributors are located at key points all over the country.

Ask a representative of the G-E Wiring Material Distributor in your neighborhood to call. You'll find him eager to help you get suitable materials for the job you are working on. You'll find him able to give you other service too . . . help on planning wiring . . . advice on priority matters . . . information on government requirements.

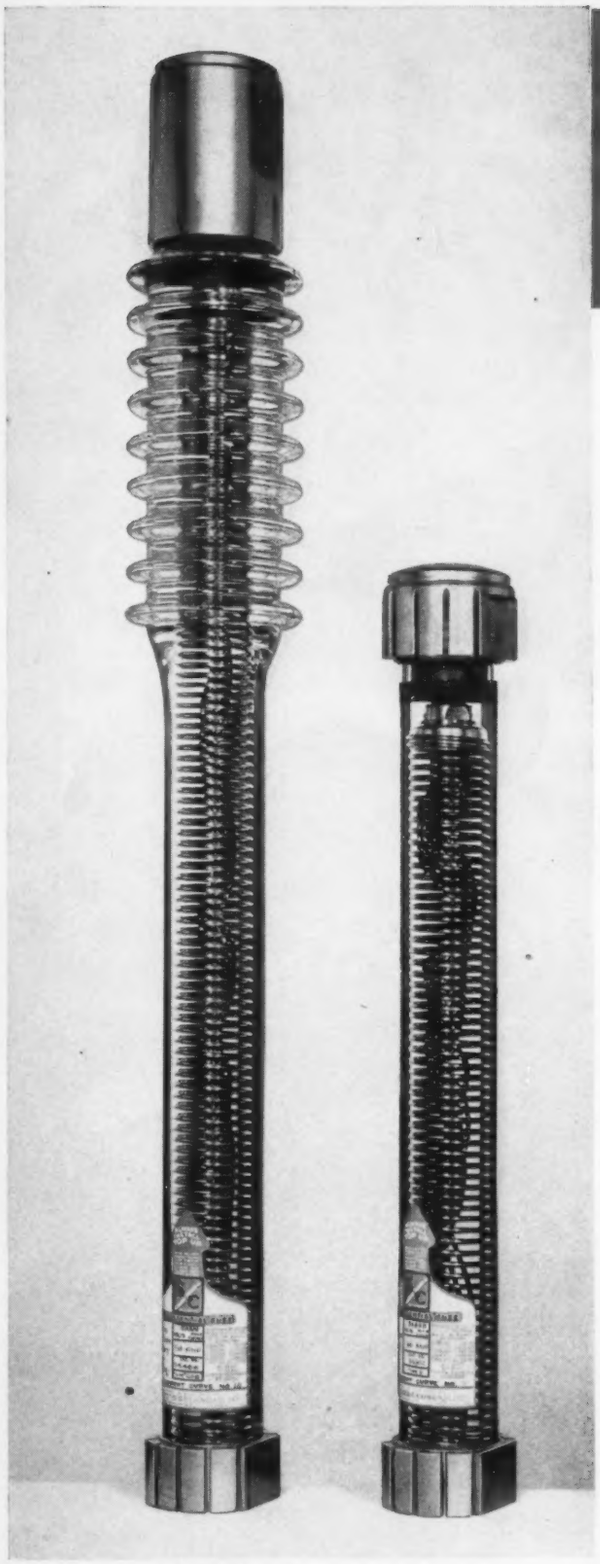
The materials handled by G-E Wiring Materials Distributors are high in quality and dependable. They are made by one manufacturer and are easy to use together. You'll like these materials, and you'll like the friendly service given by your neighborly G-E Wiring Materials Distributor.

G-E district representatives in all parts of the country help distributors serve customers. This is J. A. Mangan, who covers northern California.

G-E WIRING MATERIALS

See the G-E Wiring Materials Distributor near you about conduit, wire and cable and wiring devices for your special requirements. Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC



CUT USE OF CRITICAL METALS

Use S&C Fuses for Protection

Thousands of pounds of copper, brass, and steel are saved by the use of S&C Liquid Fuses for dependable system and equipment protection. This is accomplished because much smaller amounts of critical metals are required than by other protective and current-interrupting equipment.

S & C Liquid Fuses are not destroyed when they operate under short circuit conditions and may be put back in service with a minimum of replacement parts since the critical metals used in their construction,—the brass and copper ferrules seldom need replacement. If you have blown fuses on hand, return them to the factory now for rebuilding.

SCHWEITZER & CONRAD, INC.
4435 Ravenswood Avenue, Chicago, Illinois
Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Ont.

LIQUID FUSES

FOR DEPENDABLE SYSTEM AND EQUIPMENT PROTECTION—USE S&C FUSES

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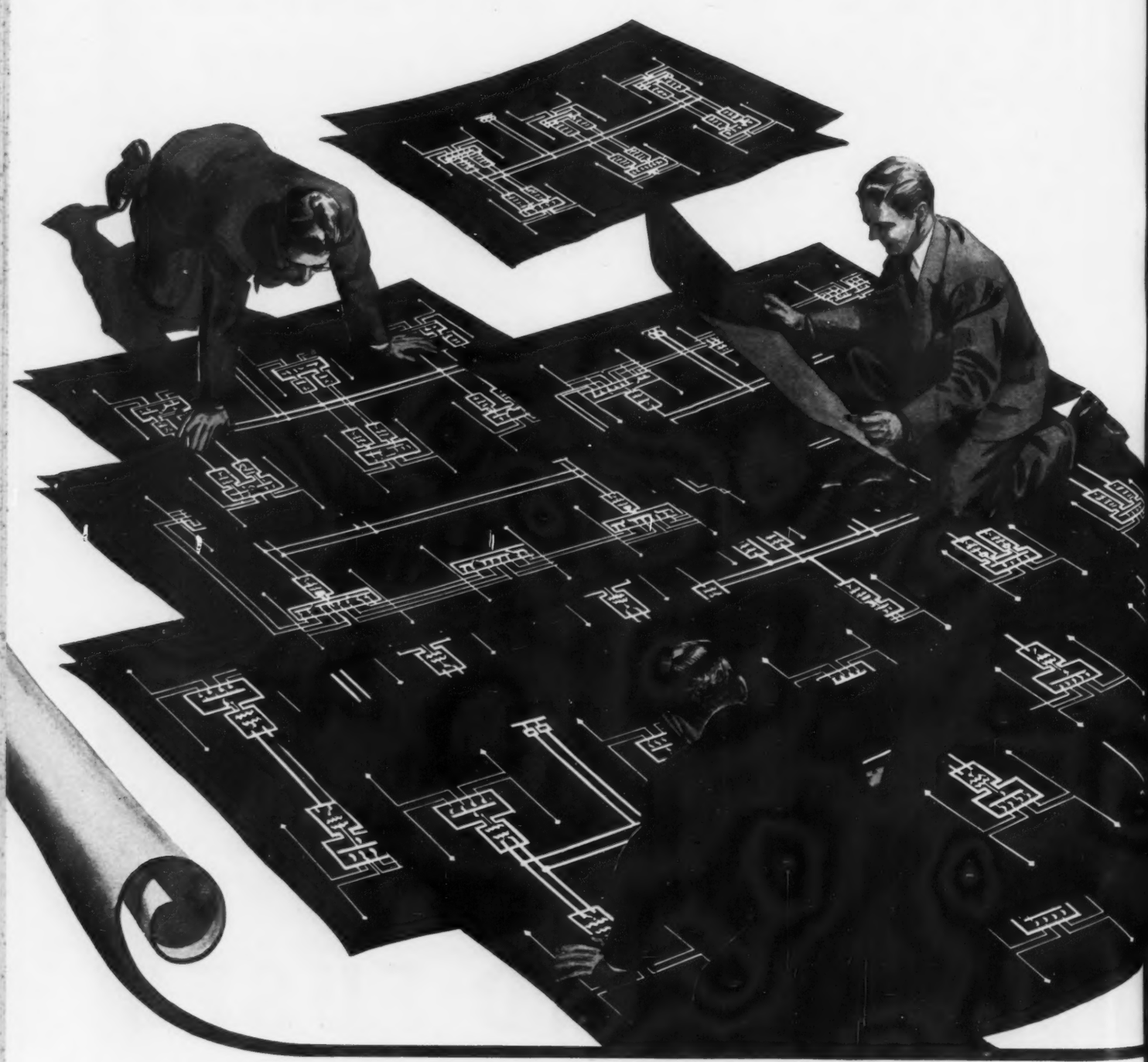
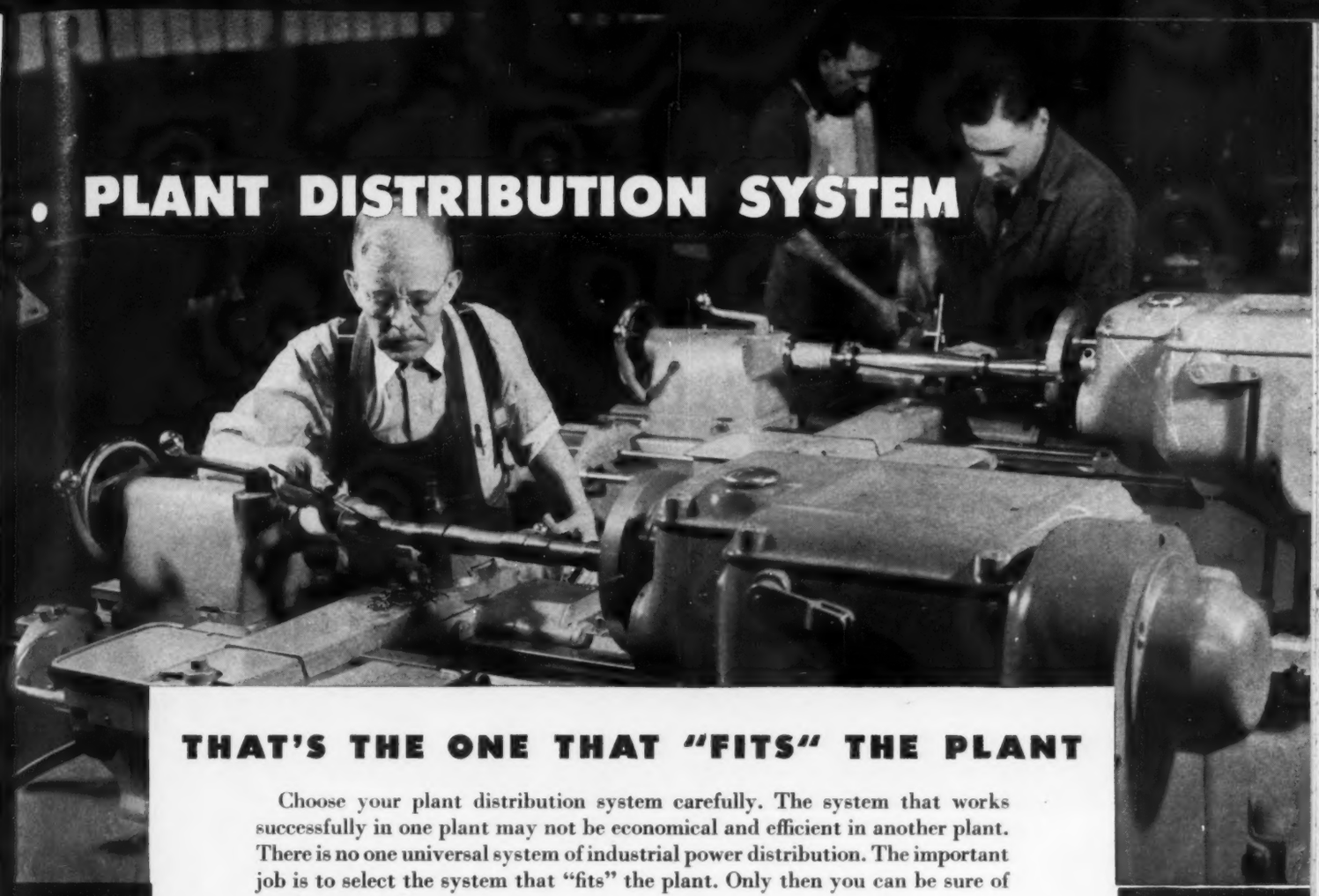
THERE IS ONLY

one best



Westinghouse



PLANT DISTRIBUTION SYSTEM

THAT'S THE ONE THAT "FITS" THE PLANT

Choose your plant distribution system carefully. The system that works successfully in one plant may not be economical and efficient in another plant. There is no one universal system of industrial power distribution. The important job is to select the system that "fits" the plant. Only then you can be sure of maximum results.

Westinghouse can supply complete equipment for all types of distribution systems, including the new Plant Network System now installed in approximately 40 large war factories.

All systems recommended by Westinghouse are designed for use with standard distribution equipment. Regardless of which system you select, there will be no need to lose time in the construction of special apparatus.

To help you save time in selecting the best system for your use, Westinghouse has prepared a special booklet that briefly describes the advantages and applications of a selected group of distribution systems. Diagrams of each system are included. For your copy, just fill in and mail the coupon.

If you want faster action or more complete details, just phone our local office. One of our engineers will be glad to call and discuss your problem.

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.

FREE QUICK FACTS ABOUT PLANT DISTRIBUTION SYSTEMS

Westinghouse Elec. & Mfg. Co.,
East Pittsburgh, Pa.

Please send book B-3152 giving quick facts on Westinghouse Distribution Systems.

*Name*_____ *Title*_____

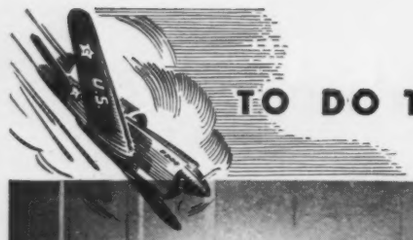
*Company*_____

*Address*_____

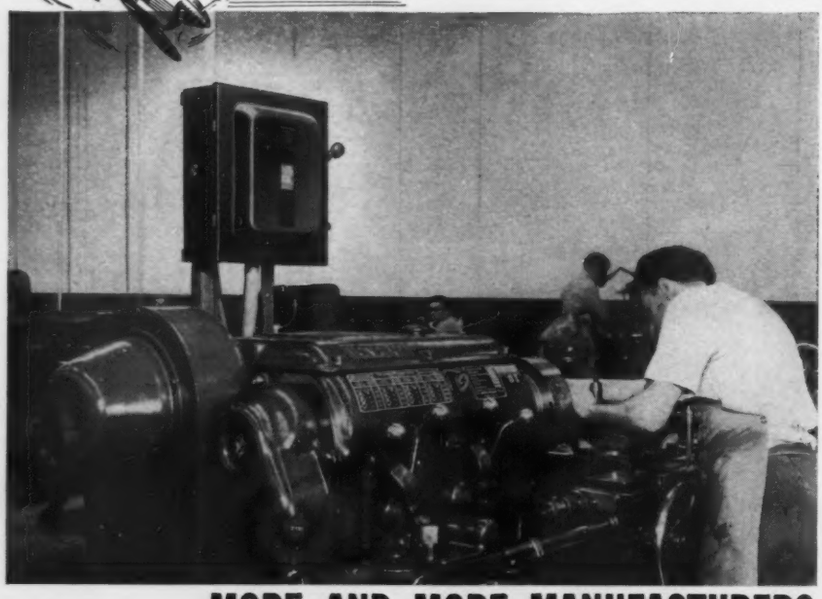
*City*_____ *State*_____

J-94509

Plant Distribution Systems

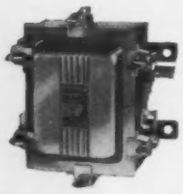


TO DO THE JOB BETTER...



MORE AND MORE MANUFACTURERS USE *Federal* SWITCHES ON JOBS LIKE THIS*

Safety Switches Type "A", "C" & "D" 30 to 1200 amperes Single and Double Throw



Weatherproof — Dust-tight Switches 30 to 1200 amperes

Complete line of circuit breakers and fusible panelboards

Today only one thing is important—Victory. There's no time left to lose—just time to WIN. That's why the men who know . . . the men turning out the planes, guns, ships and tanks are switching to Federal. The story's the same all over the country . . . wherever the pressure's on . . . wherever plants are going full blast twenty-four hours a day, seven days a week . . . wherever the job must be done better and faster . . . Federal Safety Switches are at work.

These "producers for Victory" find many advantages in Federal safety switches—trouble-free operation on essential circuits—ribbed arcing chutes—patented "griptite" fuse clamps—and many other exclusive Federal features. You will, too!—when you switch to Federal to get the job done better and faster.

*This photograph was taken in the plant of a large manufacturer of airplane parts. For obvious reasons the name of the manufacturer cannot be divulged.

Portland, Ore. 121 N.W. Fifth Ave. ATwater 5355
San Francisco, Calif. 1264 Folsom St. UNderhill 2367-8
Los Angeles, Calif. 782 E. Pico Blvd. PRospect 0229

FEDERAL ELECTRIC PRODUCTS COMPANY
64 PARIS STREET, NEWARK, N. J.

PANELBOARDS • SWITCHBOARDS • SAFETY SWITCHES • CIRCUIT BREAKERS

PRODUCTS *that are news*

Infra-Red Heat Lamps (1100)

A new line of infra-red heat lamps has been announced by the Wabash Appliance Corp. The line includes six clear, three ruby and four reflector types. All feature the M-type tungsten filament for uniform heat distribution and have their bases reinforced with asbestos-lined mechanical straps to withstand temperatures of tunnel installations. The reflector types have built-in reflector linings of pure silver sealed inside the bulbs for protection against dimming and tarnishing by fumes or dirt. Average burning life, according to the manufacturer, is in excess of 6,000 hr. on all types.

Oil Fuse Cutouts (1101)

General Electric Co. has developed a new metal-enclosed assembly of gang-operated oil fuse cutouts. Designed for economical short-circuit protection and switching, the new cutout assemblies permit totally metal-enclosed installations, either single or 3-phase, it is announced. Each unit is factory-assembled with flexible, insulated cable leads ready for connection either to single or multi-conductor cable.

According to the manufacturer, the new assemblies are particularly well adapted for use in industrial plants for branch circuits, individual transformers or banks, motors, control apparatus and electric-heating and other equipment. They can be supplied for wall or direct-to-apparatus mounting, with openings for conduit, cable or pothead connections.

Electronic Water Detector (1102)

Photoswitch Inc. has announced an electronic water detector lock to indicate water seepage in gasoline storage tanks. This device operates on 115 or 230 volts a-c or is available for battery operation; will handle output loads up to 10 amp. at 115 volts a-c.

The unit is supplied with a probe fitting which is mounted in a standard pipe fitting on the top surface of the tank, with the probe rod projecting down through the tank to the level at which water seepage is to be detected. The water detector lock is located at any point remote from the tank and wired to the probe. While the probe rod is entirely immersed in gasoline and so long as water seepage has not reached the probe, no signal is given; but when water seepage rises to contact the probe tip, an electrical circuit is completed through the water itself and the device operates, turning off pumping equipment and actuating an alarm circuit.

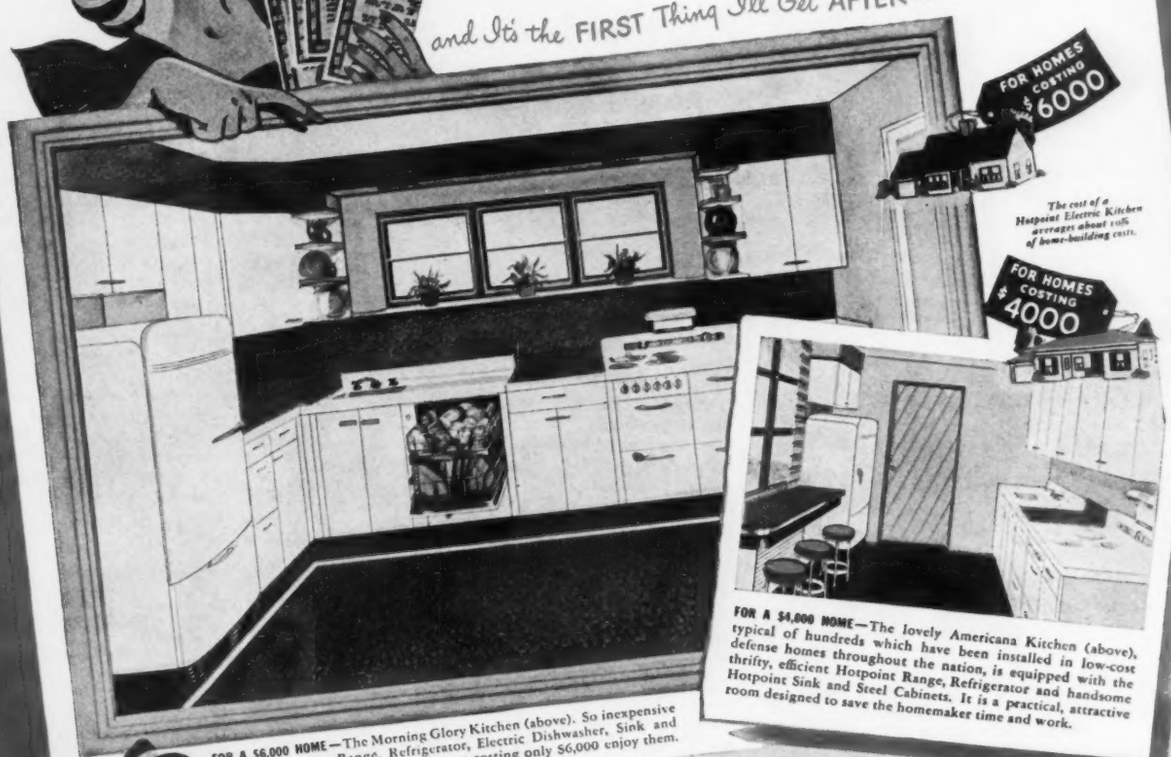
HOTPOINT'S WARTIME ADVERTISING PROGRAM

Gets a Big Hand!

My War Bond Savings Will Buy a HOTPOINT ELECTRIC KITCHEN Like This

THE OTHER DAY at Red Cross a new light dawned when one of the girls told me how surprisingly little she paid for *her* Hotpoint Electric Kitchen. Why, the money we are saving every month by investing in War Bonds will buy that Electric Kitchen after Hotpoint finishes its war job and starts making home appliances again. And believe me, I can hardly wait . . . In my new kitchen all my work will be like play!

and It's the FIRST *Thing I'll Get* AFTER *the War!*


FOR HOMES COSTING $6000
The cost of a Hotpoint Electric Kitchen averages about 10% of home-building costs.
FOR HOMES COSTING $4000

FOR A $6,000 HOME—The Morning Glory Kitchen (above). So inexpensive are the Hotpoint Range, Refrigerator, Electric Dishwasher, Sink and Steel Cabinets that thousands of homes costing only $6,000 enjoy them.

FOR A $4,000 HOME—The lovely Americana Kitchen (above), typical of hundreds which have been installed in low-cost defense homes throughout the nation, is equipped with the thrifty, efficient Hotpoint Range, Refrigerator and handsome Hotpoint Sink and Steel Cabinets. It is a practical, attractive room designed to save the homemaker time and work.

Buy War Bonds Today—Electric Kitchens Tomorrow!

Hotpoint

ELECTRIC KITCHENS

EDISON GENERAL ELECTRIC APPLIANCE CO., INC., 5676 W. TAYLOR ST., CHICAGO, ILL.

ANOTHER HOTPOINT ADVERTISEMENT

Meeting With Huge Success

WATCH for Hotpoint's War Bond advertising in *Life, Collier's, Saturday Evening Post, American Home, Better Homes and Gardens, House Beautiful* and *Bride's Magazine.* Officials of the Treasury Department have commended Hotpoint's program for adding incentive to the purchase and holding of War Bonds.

Leading utility companies, department stores and large retailers throughout the country are sponsoring the Hotpoint War Bond theme locally. Ask your Hotpoint distributor for details. Edison General Electric Appliance Co., Inc., 5612 W. Taylor St., Chicago.

Did You Know

that the engineering principles of "Gorilla Grip" Mechanical Connectors call for precisely machined pressure contact with a high electrical efficiency?

The illustration above shows how this machined pressure contact actually bites into the copper. The large indentations in the copper conductors are made by the lockring. The smaller ones are caused by the serrated inside surface of the sleeve.

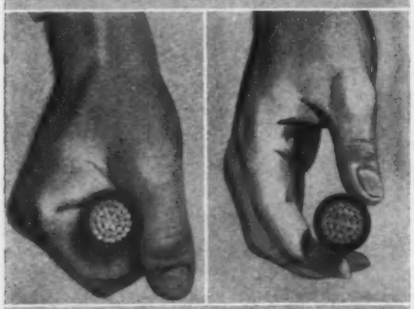


Figure A. Figure B.

It is common knowledge that you can better hold a round object by gripping it around its complete outside surface (Figure A) and not as shown in (Figure B) compressed between finger and thumb. A complete peripheral grip, as shown in Figure A, is formed by the "Gorilla Grip" Connector.

Gorilla Grips compact the conductor in such a manner as to eliminate all loose contact or distorted conductors, thereby eliminating high resistances which in turn cause heat and voltage drop.

Write today for booklet, explaining in detail, the fine features of "Gorilla Grip" Connectors.

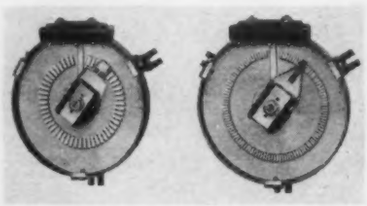
National Electric
PRODUCTS CORPORATION
1300 Fulton Bldg. Pittsburgh, Pa.

Contact Making Clock (1103)

R. W. Cramer Co. Inc. is manufacturing a Sauter contact making clock for use in conjunction with demand meters and as an impulse timer for time recording instruments. The device emits one to twelve impulses per hour by momentarily closing a circuit at predetermined fixed time intervals.

The motor is of the hysteresis type (450 r.p.m. on 60 cycles) and consumes approximately 3 watts, according to the manufacturer. Can be furnished either for 110 or 220 volts a-c- and for any commercial frequency. Contacts are of pure silver rated at 1 amp. at 110 volts a-c. Housing is of pressed steel.

Rheostat (1104)



Ward Leonard Electric Co. has developed a pressed steel rheostat with solid rectangular contacts. Rectangular contacts are available in small and large sizes. Small rectangular contacts can be furnished on 13-in. or smaller rheostats. Large rectangular contacts can be furnished on 8-in. or larger rheostats.

Fire Extinguisher (1105)

American-LaFrance-Foamite Corp. has announced a 100 lb. carbon dioxide engine for use on electrical and oil fires. This equipment has an Anti-Statik horn to protect the operator from static charge and is designed for perfect balance at wheeling height, the manufacturer states. It is said to smother fire instantly with carbon dioxide gas which expands upon discharge to 450 times its stored volume. Claimed to be non-corrosive, non-poisonous, oderless.

Thumb Spray Attachment (1106)

A "thumb spray" nozzle attachment for converting standard fire extinguisher equipment to wartime uses has been developed by the Pyrene Mfg. Co. This device clamps over the ⅝-in. hose and nozzle of any standard soda-acid, foam, gas cartridge or pump tank fire extinguisher to make it discharge a spray as well as a solid stream. The "thumb spray" is a permanent attachment but since conversion takes place only after the liquid leaves the nozzle, the extinguisher itself is not affected, the manufacturer reports.

Oil and Insulation Tester (1107)

General Electric Co. is offering an improved 35,000-volt oil and insulation testing set, which it claims can be converted for high-potential tests on a variety of materials and products.

The set consists of a 2-kva, 35,000-volt, liquid-immersed testing transformer; an air-cooled variable-voltage autotransformer; an air circuit breaker for opening the circuit after the test is completed; an oil-testing receptacle; a push-button station; and a double-range voltmeter for accurate indication of the insulation breakdown voltage. These parts are mounted as a unit on a three-wheel, ball-bearing truck.

According to the manufacturer, the oil-testing receptacle is easily removed to convert the set for standard high-potential tests on such materials and equipment as sheet insulation, cable, small transformers, rubber gloves, small motors and generators, circuit breakers, line materials, bushings and insulators.

The set is finished in black crackle enamel and is provided with a 15-ft. flexible cord and plug for connection to 115 or 230-volt a-c outlet.

Air Circuit Breaker (1108)

Westinghouse Electric & Mfg. Co. has announced a new type ANC air circuit breaker, designed to meet the circuit protection requirements on aircraft electrical systems, tanks, trucks and similar mobile equipment using a direct-current supply of 28 volts or less.

According to the manufacturer, this breaker affords both circuit operation and protection in a unit that can be installed in the same mounting space as the present toggle switch. The ANC breakers have a rating of from 5 to 20 amp. at 28 volts d-c and a 1,500-amp. interrupting capacity. The unit is manually operated with a 50° swing of the handle from the "off" to "on" position.

Circuit protection is accomplished by means of a bimetallic trip. One form of this breaker has a compensating element that will stabilize the rating of the breaker within certain limits of an ambient range from —60° to +135°F. This additional characteristic of the ANC circuit breaker is important on certain circuits for the protection of aircraft equipment.

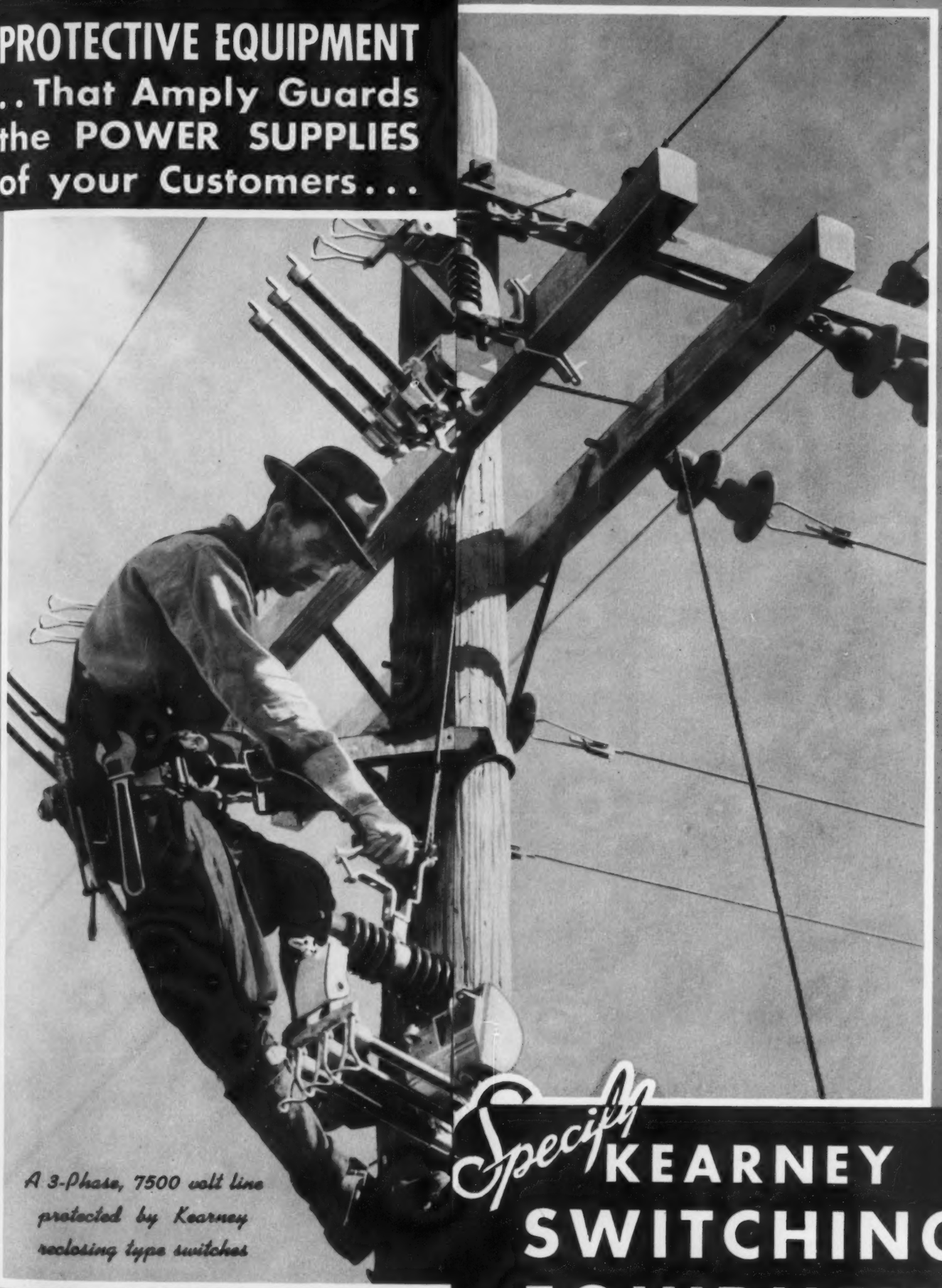
A-C Welder (1109)

An a-c welder supplementing its d-c unit and designed to increase the efficiency and step up the speed of welding heavier, thicker metals has been announced by Allis-Chalmers. In this welder the transformer and reactor are built as an integral unit and the reactor coils surround the air gap, eliminating magnetic leakage. It is claimed that this arrangement provides continuous control from 35 to 250 amp., a safe, high open circuit voltage at low current and a lower open circuit voltage at higher current. The new welder is built without plugs, taps or switches. Manual control at the top of the unit covers the entire welding range from maximum to minimum setting with less than a dozen turns of the control handle. Illustrated is the 200-amp. unit, smallest in the range of sizes.

Select—

PROTECTIVE EQUIPMENT

..That Amply Guards the POWER SUPPLIES of your Customers...



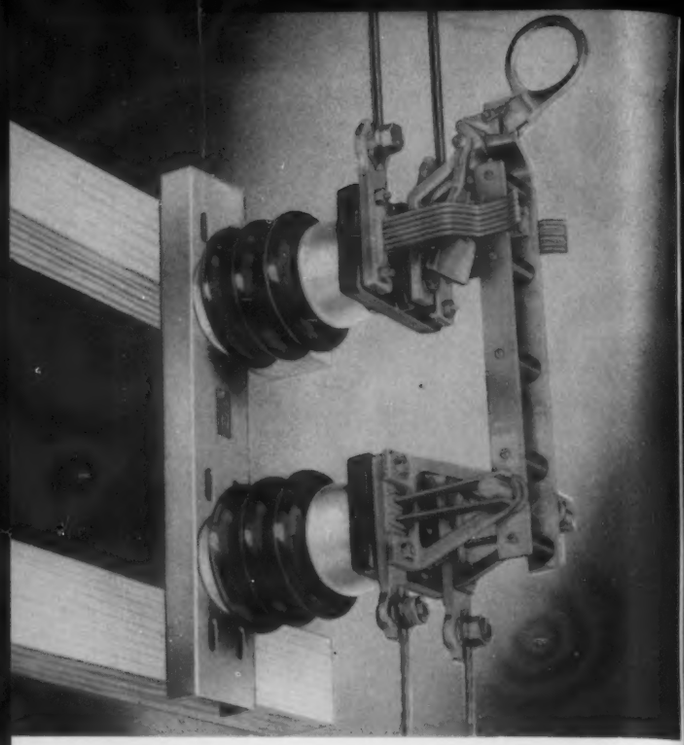
A 3-Phase, 7500 volt line protected by Kearney reclosing type switches

Specify KEARNEY SWITCHING EQUIPMENT

LOOK INSIDE for DETAILS ▶▶

SLIT-FOLD INSERT PAT. APPL'D FOR

PRINT IN BINDING

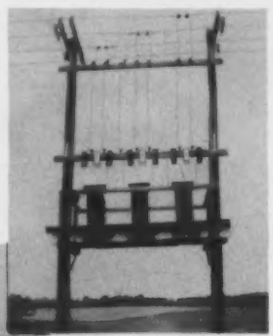


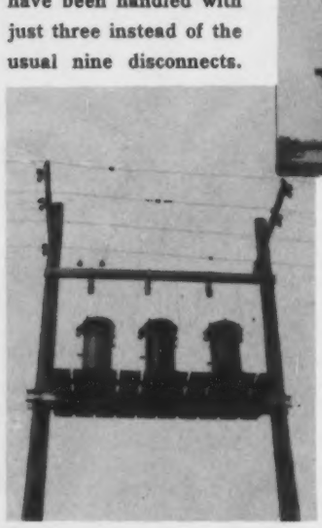
FOR YOUR REGULATORS— KEARNEY BY-PASS SWITCHES

NOW, by-pass and isolate regulators whenever necessary — safely, economically and practically — using modern Kearney By-Pass Switches, made to handle today's jobs; or maybe you want to safely isolate metering equipment for testing and maintenance. Let us tell you about these Kearney By-Pass switches.

Consider This Efficiency

As you note the illustration on the right, realize that this same sort of a platform installation of voltage regulators could have been handled with just three instead of the usual nine disconnects.





At left, a similar installation to the above, using only three Kearney By-Pass Disconnects, instead of nine conventional disconnects. Here's simplification of construction, reduced equipment costs, lower operating and maintenance expense, plus safety.

FOR BETTER MAINTENANCE and CONSTRUCTION—

Give Complete PROTECTION to Vital Production Lines

TRIP-SAVER
RECLOSING FUSE
SWITCH

Kearney Trip-Saver (Reclosing) Fuse Switches are the answer to many problems of providing ready *extra* protection to those No. 1 customers. At nominal cost, these switches which automatically restore service, after a temporary outage, can be installed at feeders to important industrials — providing two-fold protection — for the feeder and for the main line. Available in ratings 100 and 200 amperes, 5000 through 34,500 volts. Also 46,000 and 69,000 volts, 100 amperes. Write for complete details.

TRIP-O-LINK FUSE SWITCH

's a switch that gives a lot of (guaranteed) per-mance, for a little money — and it is built with a imum amount of vital materials in it. For excellent tection of equipment during these days of vital duction — get full information and low cost of rney Trip-O-Link Fuse Switches.

Fuse YOUR SWITCHES WITH QUALITY BUILT

KEARNEY FUSE LINKS

SO THAT you may select, easily and surely, the correct type and size fuse link which you need for a particular duty, and thereby get maximum service from those you use — Kearney Fuse Links come to you specially packed.

All Kearney Links are in individual bags — clearly marked with amperage rating tabs. You'll find 5 links to a handy Fuse-Pak — 5 Paks to a carton. You may also get the No. 12165 Pole-Mounting Fuse-Pak Container. Then you may always have the right fuse, at the right place at the right time. A mighty important factor of power supply, these days.

Use KEARNEY PRODUCTS

PROTECTION
duction Lines

-SAVER
OSING FUSE
VITCH

Kearney Trip-Saver (Reclosing) Fuse Switches are the answer to many problems of providing ready *extra* protection to those No. 1 customers. At nominal cost, these switches which automatically restore service, after a temporary outage, can be installed at feeders to important industrials — providing two-fold protection — for the feeder and for the main line. Available in ratings 100 and 200 amperes, 5000 through 34,500 volts. Also 46,000 and 69,000 volts, 100 amperes. Write for complete details.

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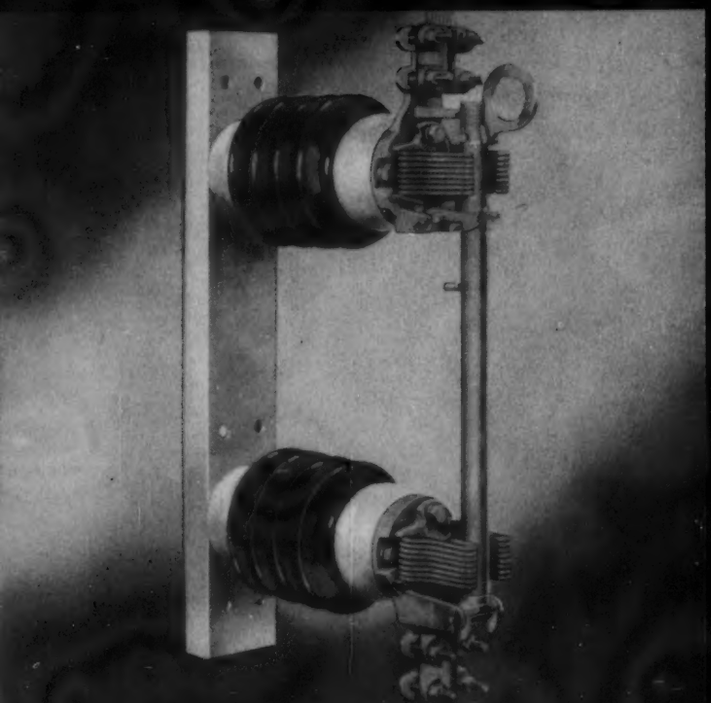
RODUCTS-

JAME
4236



KEARNEY DISCONNECTS

Right now, as you seek greater flexibility in your power system, investigate the advantages built into the Kearney line of Hook Operated Disconnect Switches. See Bulletin 312.

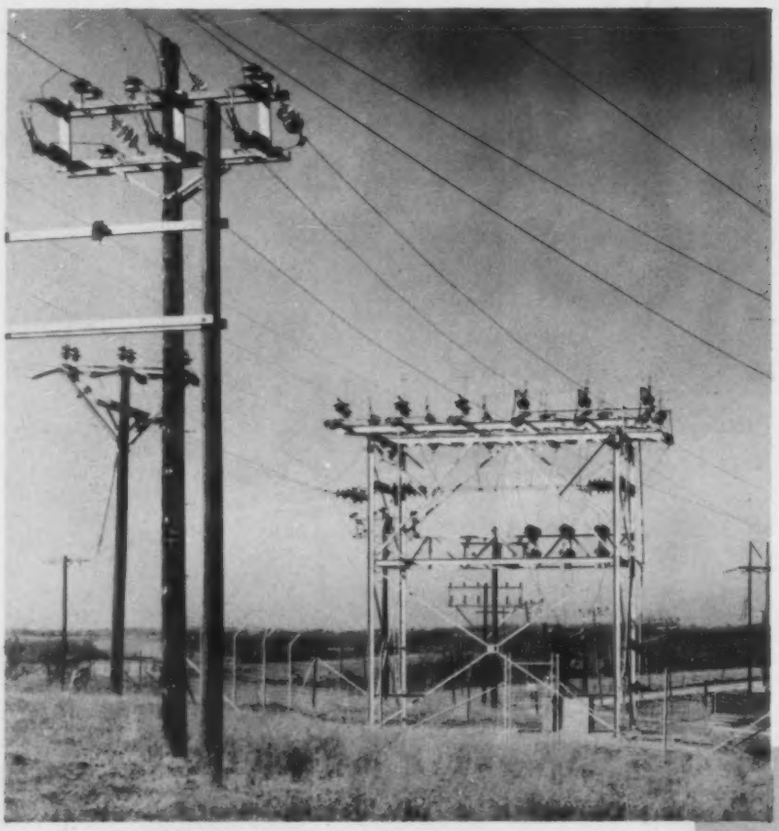
LDERLESS CONNECTIONS

For many years now, operating men have found that it pays to make good, secure electrical connections. Kearney Con-Nec-Tites are specially designed to meet both mechanical and electrical requirements with features such as patented full round washers, uniform threads to prevent binding, lead pilot to assure ready engagement of nut. These and other built-in features have made Kearney Con-Nec-Tites the choice of operating men everywhere.

Write for Details and Information

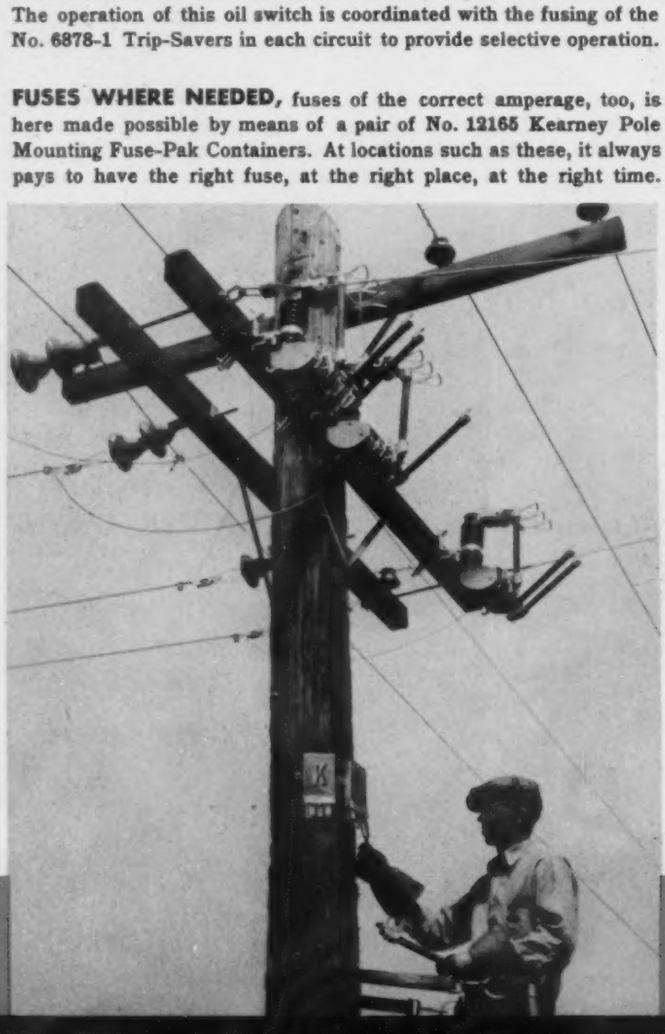
JAMES R. KEARNEY CORPORATION
4236 CLAYTON AVE. • ST. LOUIS, MO.
Canadian Plant • Toronto, Canada

A FEW MODERN APPLICATIONS OF KEARNEY EQUIPMENT

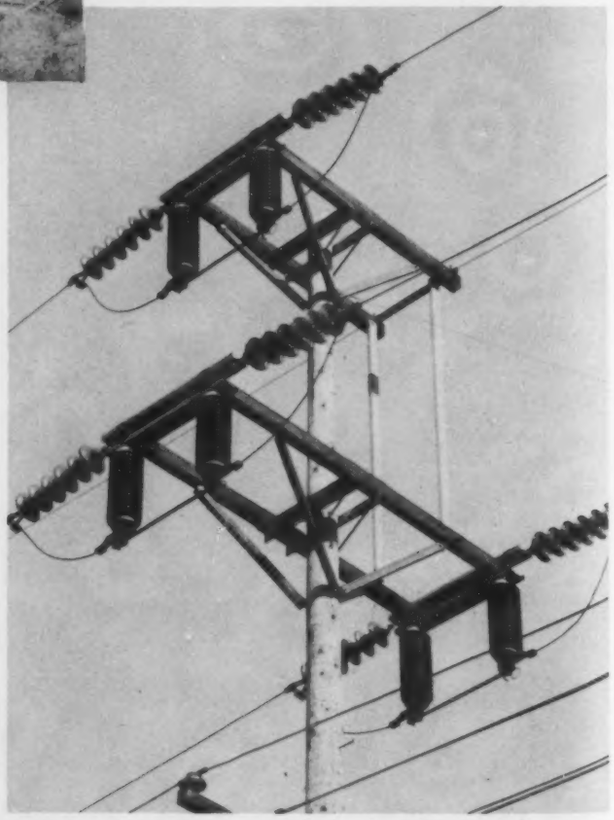


EFFECTING SAVINGS on substation structure fittings and oil circuit breakers by using Kearney Trip-Savers in each individual circuit. Three 34.5 KV circuits are controlled by the one oil switch. The operation of this oil switch is coordinated with the fusing of the No. 6878-1 Trip-Savers in each circuit to provide selective operation.

FUSES WHERE NEEDED, fuses of the correct amperage, too, is here made possible by means of a pair of No. 12165 Kearney Pole Mounting Fuse-Pak Containers. At locations such as these, it always pays to have the right fuse, at the right place, at the right time.



TRANSFORMER MOUNTED, Trip-O-Link Fuse Switches on typical rural constructions, as shown above, eliminates materials involved in crossarm or pole mounting. The Trip-O-Link Switch is a No. 6486. The Con-Nec-Tap Clamp is a No. 3517.



LINE SECTIONALIZING is economically accomplished by the use of No. 7594 Kearney Hook Operated Disconnects as shown above. Note, as illustrated, that the full insulation value of pole and arms is made available by the use of wood braces.

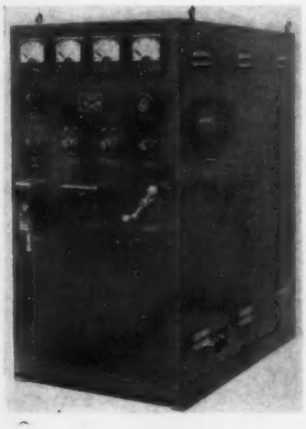
There's Further Information—
about Kearney Products Within This Insert

For Switching Jobs
USE KEARNEY EQUIPMENT

Cable-Fault Reduction (1110)

A line of metal-enclosed d-c cable-fault reduction and localization sets has been announced by General Electric Co. for use by utilities in reducing and locating faults on power-cable systems. Although the "direct" method necessitates traversing the cable and observing indications at manholes, according to the manufacturer it is positive and, for average faults, requires less time than other popular methods of fault location.

The set consists of a Thyratron rectifier, con-



trol, motor-driven interrupter and current-limiting reactor, completely enclosed in a metal housing, and a portable field set for taking readings along the cable. The set first reduces the resistance of the fault to a satisfactory value and then transmits a tracer current which may easily be recognized by traversing the cable with the portable field set, the manufacturer states.

This equipment can be used up to its maximum-rated voltage for d-c high-potential tests on cable systems and other apparatus. It is available in eight different ratings up to 20,000 volts and up to 20 amp.

Wire Rope Sling (1111)

Under the trade name "Flatweave," John A. Roebling's Sons Co. is manufacturing a new wire rope sling which it states was designed specifically for lifting light and medium loads where the legs choke the load or the sling comes in direct contact with the load being lifted.

According to the manufacturer, the sling is light, flexible, non-kinking, non-spiraling and has a flat bearing surface which allows an even pressure on each of the six ropes which comprise it. That its construction eliminates possibility of scissors or shearing action between the various ropes; the same safe loads can be allowed with loops as with socketed ends; loops can be used as chokers without the use of thimbles; there are no splices, tucks or servings to become dislodged or loosened — are other advantages claimed by the manufacturer.

F-Lamp "Slide Grip" (1112)

Sylvania Electric Products Inc. is equipping all its continuous-row industrial fluorescent fixtures with "Slide-Grip" hangers. These adaptable mounting clamps are said by the manufacturer to provide faster installation and easier maintenance. It is claimed also that their flexibility allows for better alignment of fixtures. The new device offers applications for chain, surface, rod or messenger-cable mounting.

The FIRST Real Starter for Starter Sales

For the First Time Fluorescent Starters Reach the Limelight in

LLOYD STARTER DISPLAY
No. FS-24
With 10 FS-2 and 10 FS-4

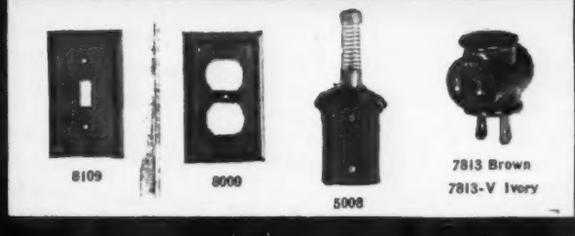
Lloyd Guaranteed Fluorescent Starters
Approved by Electrical Testing Lab., Underwriters' Labs., and Canadian Engineering Standards Assoc.

It's colorful. It puts starters in the front lines. Will definitely sell more of these widely advertised Lloyd starters . . . the BIG REPEAT ITEM in the fluorescent field. Use this display. Make more sales!

ORDER TODAY
DISPLAY WITH 20 STARTERS
Dealer's Cost $4.00

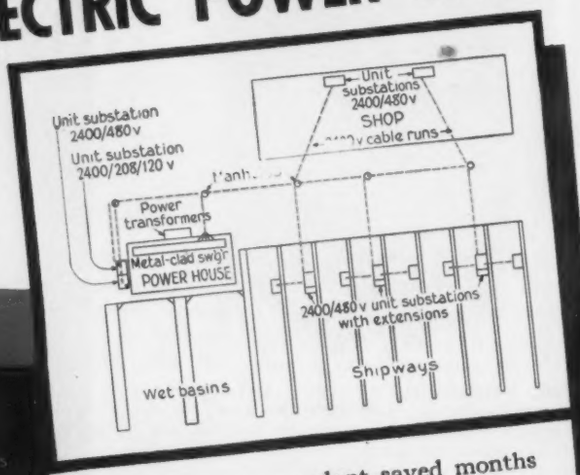
LLOYD POLICY INSURES QUALITY

LLOYD PRODUCTS CO.
Box C — Edgewood Station, Providence, R. I.
Representatives in 22 Leading Cities
Export Office — 100 Varick St., New York City

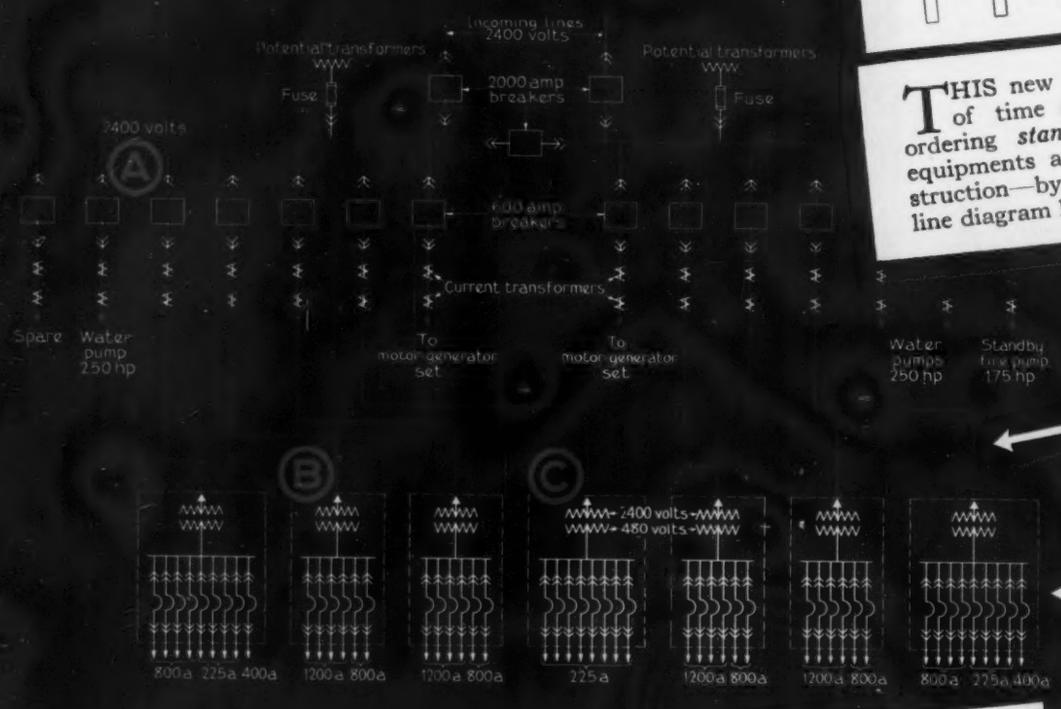


1/4 THE TIME 1/7 THE COPPER

AND A BETTER ELECTRIC POWER SYSTEM



THIS new war plant saved months of time and tons of copper by ordering *standard* power distribution equipments at an early stage of construction—by means of a simple one-line diagram like that below.



Power is distributed at high voltage right to unit substations at the load centers—

—from where it is distributed at 480 volts directly to the loads.

Many war-production factories are ordering plant distribution equipments at an early stage of construction by taking these three simple steps:

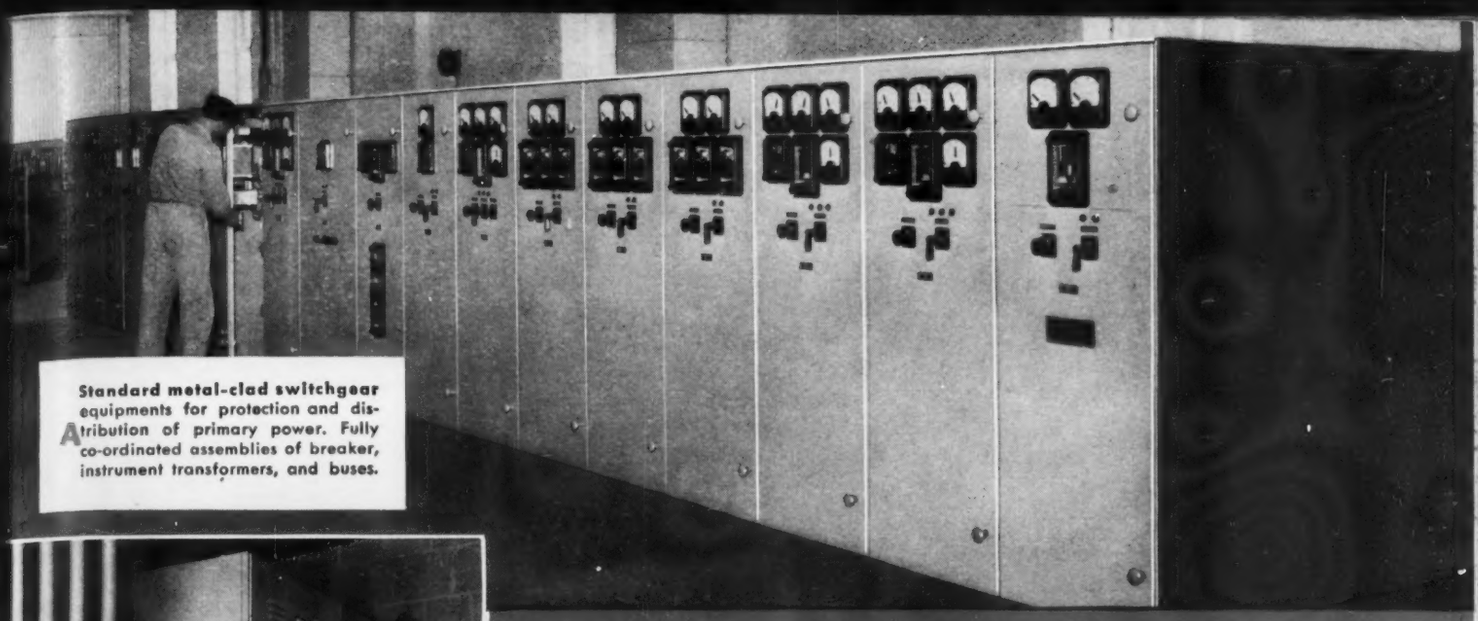
1 ***Calculate the total kva you need.*** Your consulting engineer can help you to determine this accurately.

2 ***Divide the load area into separate load zones of 500, 750, or 1000 kva each.***

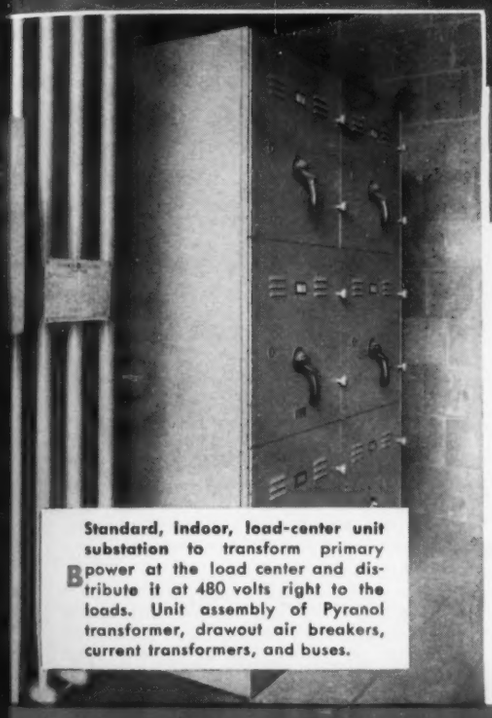
3 ***Divide the load of each zone into feeder loads,*** and draw a one-line diagram of your proposed load-center system, giving the functions to be performed and the ratings required. ***With this one-line diagram you can immediately order standard G-E switchgear equipments and unit substations.***

For further aid, ask for our new bulletin, No. GED-1006.

The Navy "E", for Excellence, has been awarded to 92,780 General Electric employees in six plants manufacturing naval equipment.



A Standard metal-clad switchgear equipments for protection and distribution of primary power. Fully co-ordinated assemblies of breaker, instrument transformers, and buses.



B Standard, indoor, load-center unit substation to transform primary power at the load center and distribute it at 480 volts right to the loads. Unit assembly of Pyranol transformer, drawout air breakers, current transformers, and buses.

MONTHS SAVED BY ORDERING STANDARD EQUIPMENTS

STANDARD G-E load-center power units were ordered for this war plant soon after construction started. A simple one-line diagram like that at the left put our factory right to work. Metal-clad switchgear and unit substations were installed in *one-fourth* the time needed for non-standard, piecemeal assemblies. They were received at the job when needed—all ready to be set in place and connected.

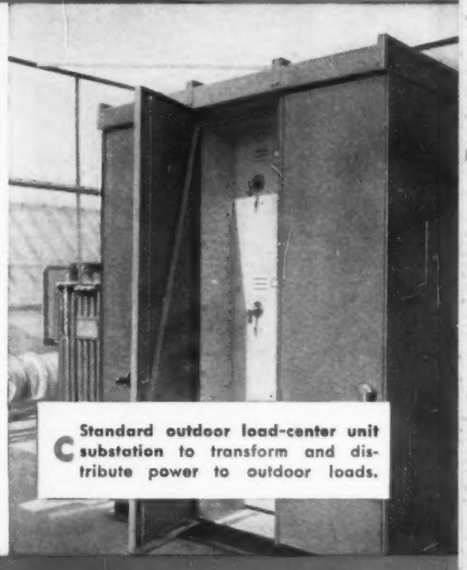
On this page are views of a few of these standard equipments—installed. They are typical of G-E load-center equipments that are being installed quickly and easily in plants everywhere. Note the metal-enclosed construction that safeguards workmen and production.

SAVED 145 TONS OF COPPER WITH LOAD-CENTER POWER DISTRIBUTION

ENGINEERS for this new war plant saved 145 tons of cable copper by taking high-voltage power right to the load centers, as shown at the left. In addition, they got a power distribution system that was so safe and efficient that, when need for additional capacity suddenly arose, they ordered another, a ***duplicate*** system—and saved another 145 tons of copper.

What's more, it took less copper to *build* these standard metal-clad units. The switchgear equipments shown at the top of this page took but 47 pounds of copper each. An open-type, piece-meal assembly would have taken more than four times as much.

If you need electric power for a new, enlarged, or converted war plant, we know you'll be pleased to learn how much copper and other critical materials you can save by using these standard load-center equipments. You'll find, too, that you can get them on the job quickly, and obtain a new high degree of safety and operating dependability. The nearest G-E office is ready to help you. *General Electric, Schenectady, New York.*



C Standard outdoor load-center unit substation to transform and distribute power to outdoor loads.

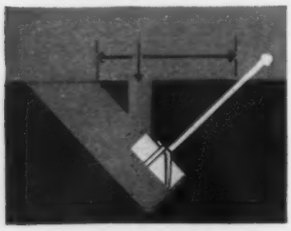
GENERAL ELECTRIC

854-19-1200

FOLLOW THESE HINTS FOR FASTER

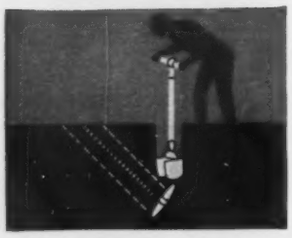
ANCHOR SALVAGE

Putting abandoned anchors back in service saves materials and avoids delivery delays. Here are some hints for retrieving them.



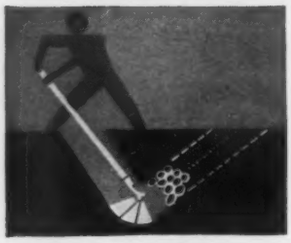
NEVER-CREEP ANCHORS. It is unnecessary to dig a pit, or to rebore the original hole. Instead, bore *straight down* at a point ⅔ of the distance from the rod to the edge of the original hole (see illustration). This should strike the top of the anchor plate and permit the hook on a Never-Creep Installing Bar to be attached. Now drive the rod down a few inches, lift the plate a few inches, and pull the rod out. The plate can then be lifted out of the hole with the installing bar.

★ ★ ★



EXPANDING ANCHORS. First, unscrew and remove the rod by using a small bar in the eye as a wrench. Now bore straight down over the anchor, hook onto it with the installing bar and pull it out of the hole. This is generally easier than reboring the original hole and attempting to collapse the anchor before removal.

★ ★ ★



CONE ANCHORS. Removing a cone anchor is usually more difficult because of the rocks used in perfecting the wedge. Bore a hole back of the anchor at an angle as illustrated. After the cone has been located and the rod removed, the anchor can be manipulated around and removed with the hook on the installing bar, free from the obstructing rocks.

★ ★ ★

SCREW ANCHORS. No-wrench screw anchors are removed simply by turning them counter-clockwise using a rod through the eye as a wrench. A counter-clockwise turn on Rock Anchors reduces the expansion and permits their withdrawal through the drilled hole.

Your GRAYBAR Representative is anxious to help you in any way he can in furnishing parts or accessories for reuse of salvaged equipment. When *new* pole line equipment is essential to speed the war program, just call GRAYBAR.

GraybaR

Everything Electrical . . . . THAT IT TAKES TO WIN!

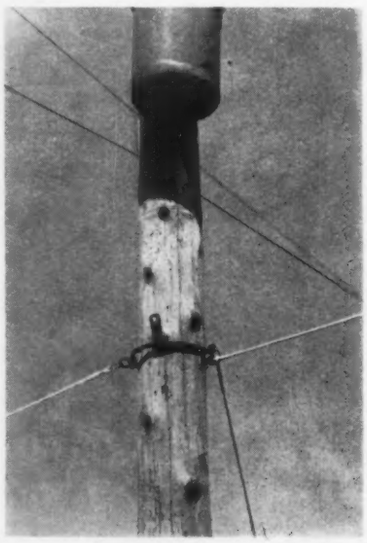
IN OVER 80 PRINCIPAL CITIES

Executive Offices: **GRAYBAR BUILDING, NEW YORK, N. Y.**

Guy Tongs (1113)

Guy tongs for steadying and holding in position poles of various heights which are weakened at the bottom have been designed by the James R. Kearney Corp. These tongs will fit poles with diameters as much as 11 in. and, according to the manufacturer, are readily installed with a pike pole.

The circular steel tong is hinged at the center and may be operated to fit around



the pole as high up as a workman can reach with the pike pole. When the tong is in position, the ends of the circular arms are crossed and pulled together with ropes, permitting the spikes to bite into the pole and hold securely.

Where poles are sufficiently tied in at the top, the guy tong can be installed at the proper location by a lineman before the conductors are untied. In the case of high poles, not sufficiently tied in at the top, the tong can be installed as high as the workman can place it from the ground; and the lineman can then climb up to this point and install a second guy tong higher up on the pole to provide greater security, it is stated.

Electronic Crest Voltmeter (1114)

General Electric Co. has designed a new electronic crest voltmeter to measure ignition voltages of internal combustion engines; surge voltages caused by corona and surface discharges in the insulation on motors, generators and cables; and other repeated-impulse voltages up to 30,000 volts.

Weighing 23 lbs., the instrument is suitable for field measurement, such as trouble shooting and determination of operating conditions and also for testing aircraft engines in flight, the manufacturer states.

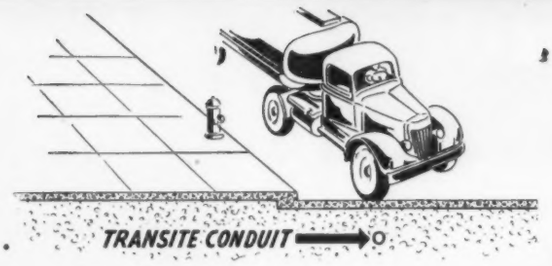
This unit has a self-contained battery power supply, making it usable in areas where no electric power is available. It is equipped with an aircraft-instrument movement to provide resistance to vibration.

Insulating Varnish (1115)

The Sterling Varnish Co. has announced a new flame-resistant insulating varnish, R-878. The manufacturer claims this varnish is mechanically strong and dries all the way through when applied to electrical apparatus; after drying will not support combustion when the flame is removed; will not melt or resoften under operating temperatures.

WHY *TWO TYPES* OF *TRANSITE DUCTS*?

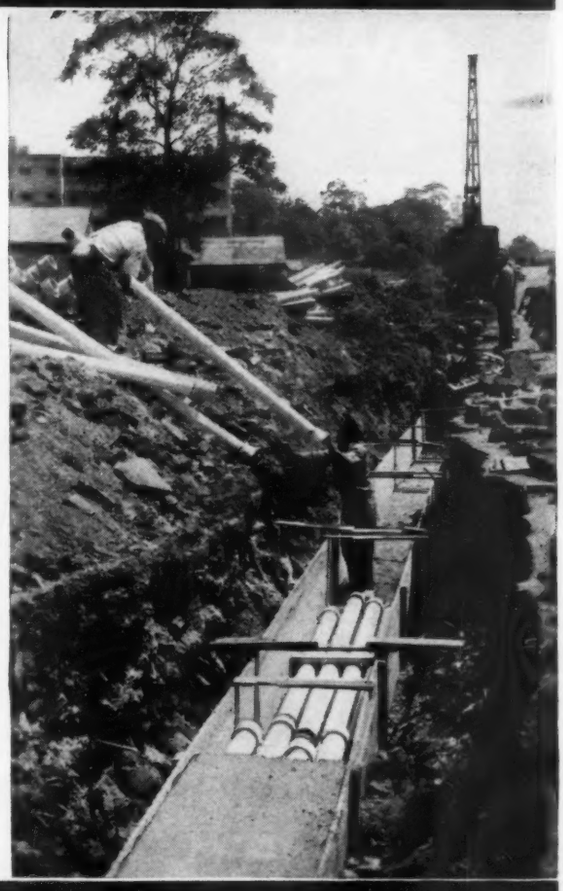
For Use Without a Protective Envelope . . .



Transite Conduit saves on labor and material, for it is so strong it needs no protective casing. It maintains its strength and true form under heavy earth loads and traffic pressure. Can't rot . . . effectively resists soil corrosion, smoke and fumes.

For Use With a Protective Casing . . .

Transite Korduct is thinner walled, lower priced, otherwise identical with Transite Conduit. Its long lengths mean fewer joints, fewer spacers. And its unusually high rate of heat dissipation lowers cable operating temperatures, boosts system capacity.



BOTH THESE DUCTS PROVIDE THESE ADVANTAGES AS WELL . . .

1. Minimize fire hazard—Transite Ducts cannot burn because they are made of asbestos and cement. They will not contribute to the formation of explosive or combustible gases.

2. Eliminate electrolysis problem—Inorganic and non-metallic, Transite Ducts can never be affected by electrolytic action.

3. Make cable pulls easy—The smooth bore of Transite Ducts speeds up cable installation. Because the ducts stay smooth in service, cables can be removed and replaced at any time with virtually no damage to sheathing.

4. Save time on installation—Light in weight, supplied in long lengths, Transite Ducts are so easy to assemble that the minimum of time and expense is required for any job. Write for Data Book DS-410, Johns-Manville at Los Angeles, San Francisco or Seattle.

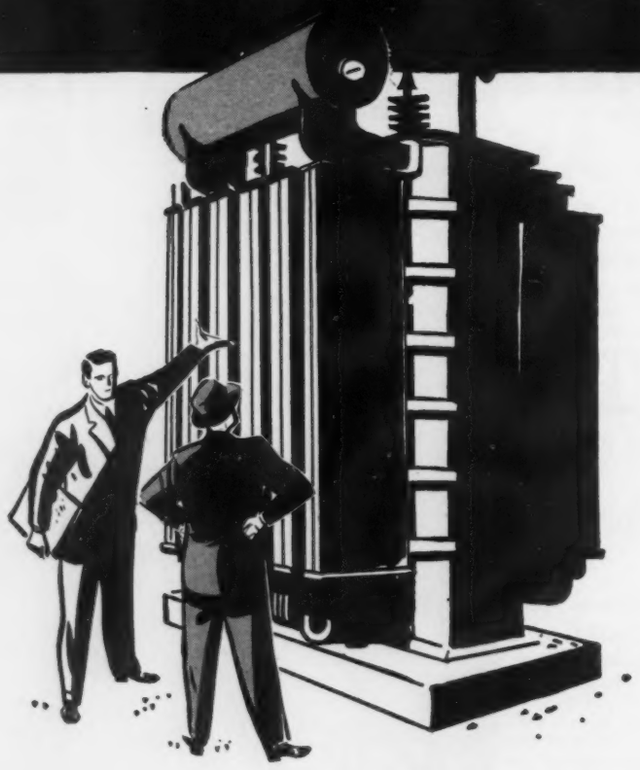
Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT— for installation in concrete

TRANSITE CONDUIT— for exposed work and installation underground without a concrete encasement

PREVENT OVER-HEATING!



Growing loads on transformers make it necessary that they be given the best kind of protection against over-heating and loss of efficiency. To meet this need, Union Oil Company produces a product —Red Line Transformer Oil—with 5 outstanding qualities.

1. Red Line Transformer Oil is *extremely stable.* Under exhaustive tests, transformers using Red Line have remained free from sludge accumulations and other deposits that retard transfer of heat and cut down efficiency.

2. Because of its *low viscosity,* Red Line Transformer Oil rapidly dissipates heat produced from waste energy, speeds circulation in circulating-type transformers.

3. Red Line Transformer Oil has *high dielectric strength.* Extreme care in handling guarantees freedom from moisture, lint and other foreign particles that reduce the insulation qualities.

4. Its high *flash point* minimizes evaporation losses at high temperatures.

5. Red Line Transformer Oil is exceptionally *free-flowing* at 50° F., below zero, an important quality for transformers that must operate efficiently in cold climates.

Red Line Transformer Oil is built to meet the toughest assignments that wartime production presents. It has *all* the answers to your transformer oil problems. Call your Union Oil representative today!

UNION OIL COMPANY

RED LINE *TRANSFORMER OIL*

OIL IS AMMUNITION—*USE IT WISELY*

Hinged Pole Splice (1116)

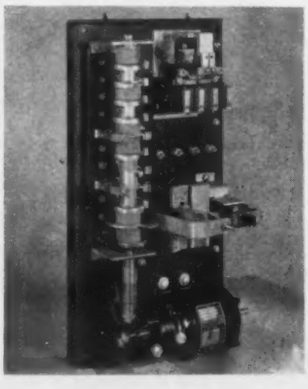
A hinged pole splice for trouble shooters is being manufactured by A. B. Chance Co. This tool folds up for carrying on trucks or where space is limited. Chief safety feature, according to the manufacturer, is that it cannot be taken apart and used as a short tool with insufficient insulation. The hinge is closed and locked by a spring button.

Hot Splice Tool (1117)

A. B. Chance Co. has developed a crimping device for applying the Nico-Press type sleeve splice to hot lines. The device is used in conjunction with the Universal splice tool and crimps the sleeve to hold the conductor in the splice. It is designed to clamp down and slip past dead center to avoid exerting too much pressure, the manufacturer reports.

Synchromatic Relay (1118)

A new synchromatic relay for field application has been designed by Westinghouse Electric & Mfg. Co. This relay consists of two elements, one that is speed responsive and one time responsive. The speed responsive element is a current relay and the time responsive element is a rotary drum switch. According to the manufacturer, the unit meets all six basic requirements for synchronous motor control: (1) maximum nonsynchronous speed attained before field application; (2) minimum power required because synchronizing is never attempted before maximum speed is attained; (3) synchronizes in minimum time consistent with maximum speed; (4) positive synchronizing sequence; (5) minimum line disturbance because of favorable rotor position; (6) automatic pull-out protection. The relay is designed for panel mounting or modern dead front, metal enclosed, swing-door-type control structure.



CHECK THE FACTS on R&IE Products

1 Cylindrical, isolated phase bus, individually housed to prevent interphase short circuits.

2 Mounting frames take all stresses. Bus easily mounted on wall, floor, or ceiling or other structures. Housings are enclosures only.

3 Insulators are used only in compression. All insulators are interchangeable.

4 Conductors supported by sleeve can be either anchored for fixed position or allowed to slide for expansion position. Conductors can be square, round, channel or bar, bare or insulated.

Enclosed ISOLATED PHASE *Bus*

An original R&IE development. This new type of bus is suitable for any voltage and current. It offers greater safety, flexibility, ease of installation and inspection, than any other type of bus arrangement. Conductors may be installed, aligned, adjusted and inspected before covers are attached. Inspection is possible at any time, at any location, by removing a few bolts and cover.

ENGINEERING AND PRODUCTION
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METAL HOUSED, ISOLATED BUS
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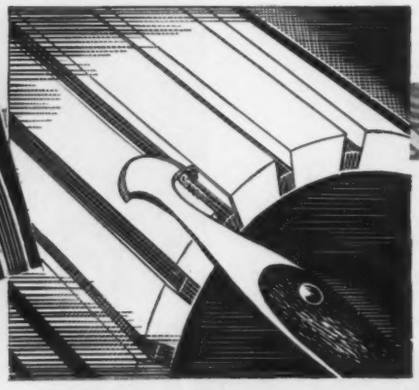
AUTOMATIC THROW-OVER EQUIPMENT
•
METAL CUBICLES
•
INTERLOCKS
•
TESTING DEVICES

RAILWAY AND INDUSTRIAL ENGINEERING CO. • GREENSBURG, PA.

In Canada—Eastern Power Devices Ltd., Toronto

The A B C of Good Commutation and Electrical Machine Performance

● Serious shutdowns and consequent delays in the production and delivery of urgently needed materials can be avoided by observing these simple precautions in the maintenance of motors, generators and converters. Under present conditions, dependable and uninterrupted performance of electrical power equipment is of utmost importance. Keep your machines in readiness to deliver full output at all times.



Keep Commutators and Rings Clean

Cleanliness is of paramount importance in the continuous operation of brush-using equipment. Time spent on keeping commutators, rings, brush holders and rigging free from dust, dirt, oil and film pays dividends. Use a suitable canvas wiper frequently on commutators and rings. Keep them clean and keep them running.

Keep Undercut Commutators Free from Side Mica

Thin edges of mica along the sides of slots of undercut commutators are a frequent source of trouble. Special care should be taken to inspect each slot carefully and to remove all side mica when undercutting commutators. Bad sparking and serious commutator burning can be avoided by observing this precaution.

Keep Brush Pressure Uniform and Correct

The spring pressure applied to brushes has a marked influence on brush performance. Equal distribution of current among all brushes requires that the pressure on all brushes be kept as nearly equal as possible. Check brush pressure frequently and adjust it to compensate for brush wear. Use pressures recommended for the grade of brush and class of service in which it is used.

MODERN PYRAMIDS will tell you more

This series of bulletins contains practical information on Commutation, Brush Operation and Machine Maintenance to help conserve present equipment and to keep it in continuous and efficient operation. If you are not receiving these bulletins write us direct or contact your National Carbon representative.

The services of our engineering staff are available for the proper selection and application of "National" Carbon Brushes on all types of equipment and for every class of service.

NATIONAL CARBON COMPANY, INCORPORATED

Unit of Union Carbide and Carbon Corporation

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BULLETINS

data books, etc.

Motor Selection (1119)

Allis-Chalmers has announced a new motor bulletin to aid in choosing correct motors for wartime applications. Charts simplify determination of all electrical and mechanical characteristics of the motor types designed for specific applications. For each design and application relationship, rating, duty, torques, starting current, efficiency and slip are indicated. In addition construction features of various Allis-Chalmers motors are described in the booklet and typical applications illustrated. Speed-torque curves and discussions of several engineering phases of motor application are included.

Indoor Circuit Breakers (1120)

Roller-Smith Co. describes 15,000-volt oil circuit breakers for indoor service, classes 150-TCR-3 and 250 TCR-3, in a booklet released recently. This bulletin lists the various sizes of breakers with their interrupting ratings, closing and tripping currents, amount of oil required and approximate shipping weights. Control diagrams, methods of tripping and dimensional data are given.

Telescopic Elevator (1121)

Lewis-Shepard Sales Corp. has released literature on a 40-ft. telescopic portable elevator for use on maintenance and construction work. This device raises and lowers material and gives platform footing, the manufacturer reports. Suggested uses include installation of wiring and lighting fixtures.

Electric Air Cleaner (1122)

A six-page bulletin describing the use of the Precipitron, electric air cleaner, in war industry has been announced by Westinghouse Electric & Mfg. Co. The bulletin describes seven applications, with illustrations. Data on operation of the Precipitron are supplemented by cutaway views of the power pact and cells.

Synthetic Rubber (1123)

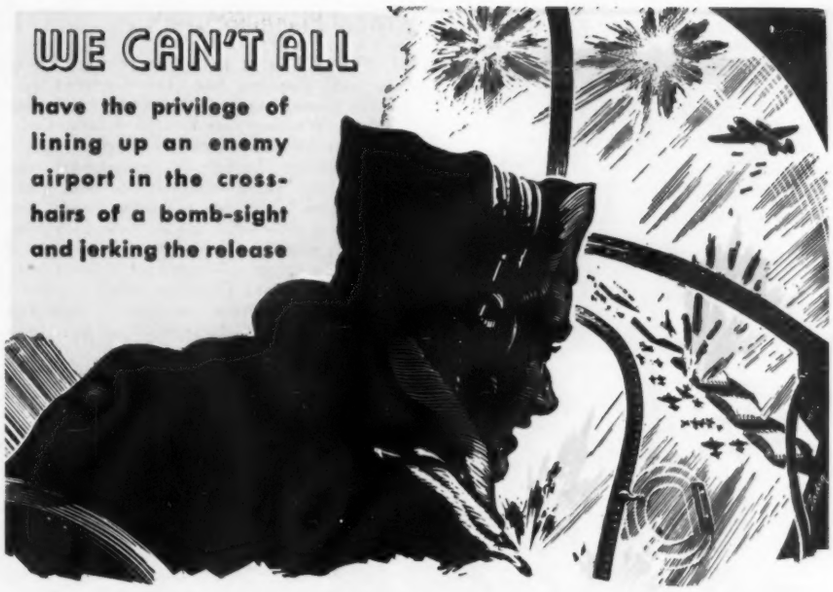
Electric equipment for synthetic rubber production is covered in a 52-page publication issued by General Electric Co. This publication emphasizes the part electric equipment plays in the progressive stages of synthetic rubber production.

Distribution Transformers (1124)

R. E. Uptegraff Mfg. Co. has issued a new bulletin on its distribution transformers. Eight types are illustrated and described briefly in the 4-page bulletin. General information about the line also is included.

Ward Leonard Products (1125)

Ward Leonard Electric Co. has issued new catalogue sheets on several of its products, including Thermal time delay relays; Vitrohm strip resistor; Midget metal base relays; motor disconnect switches and motor starters.



ONLY A COMPARATIVE FEW
of us will feel the exultation of seeing an enemy raider through a periscope, watching it disappear as an American torpedo goes home

Millions of us must be content with doing the unspectacular. Millions of us must remember that for every stick of bombs released, for every torpedo a U.S. ship drives into its target, literally hundreds of our humble, unspectacular jobs had to be done...and done right...and done on time. Millions of us must remember, every minute of every hour of every day, that there is no unimportant job...that we will win this war at our desks, at our machines, with our picks and shovels...by doing our own jobs better than ever before!

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA
San Francisco Los Angeles · Seattle · Portland

ROEBLING
THE PACEMAKER IN WIRE PRODUCTS
JAR ROEBLING

Win the WAR ON WASTE

• Now is the time to wage war on waste. Food conservation—labor, fuel and energy can best be done the electric way.

Many users of Lang electric commercial cooking appliances tell us of their experiences in saving, speeding up operations and in turning out better quality meals. Lang construction assures long life and efficient operation. Lang automatic controls save time and effort of chefs.

Today, Lang is building for the army, navy and—Victory. These orders are the FIRST orders of the day. However, we can take care of our commercial customers, too.

We urge anyone considering the purchase of Lang electric equipment to plan ahead and order ahead.

F. S. LANG MFG. CO.

Portland—Seattle—Spokane

Builders of

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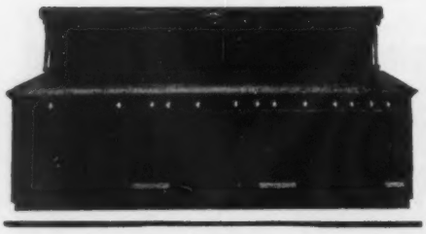
STANDARD AND CUSTOM-BUILT HEAVY DUTY ELECTRIC RANGES, COOKING TOPS, OVENS, GRIDDLES.



Meal Planning (1126)

"The ABC's of Eating for Health", a guide to meal planning, has been prepared by Mrs. Julia Kiene, head of the Home Economics Institute, Westinghouse Electric & Mfg. Co. The 16-page handbook contains a list of daily food requirements based on government recommendations and a blueprint for meal planning. A chapter is devoted to buying foods, another to saving vitamins in foods. Four easy rules for cooking vegetables are listed. A vitamin chart gives the foods in which each vitamin is found and the common symptoms when a given vitamin is missing from the diet. A second chart lists minerals. A diagram shows how to store foods in the refrigerator.

Fuel Conservation (1127)

General Electric Co. is distributing a consumer booklet, "Tips on Fuel Conservation." Written for all householders regardless of the type of heating equipment they use, the booklet includes three sections. The first concerns heat loss generally; the second covers heating equipment and heating systems with suggestions for saving fuel; the third deals with service calls and gives suggestions for avoiding unnecessary calls. A section at the end of the 40-page booklet covers the functions and features of G-E automatic oil heating equipment.

Liteway Fixtures (1128)

Day-Brite Bulletin F-62 is a data sheet on the company's V-series Liteway troffer-type fixtures using non-metallic materials. The V-series Liteway, for two 40-watt fluorescent lamps, is said to be practically identical in appearance and performance to the standard all-steel Liteway and to require approximately 60% less steel in its construction. The substitute materials are used in the top, side panels and louvers.

Speed Indicator (1129)

Herman H. Sticht Co. has issued Bulletin No. 715, describing its model DS chronometric tachometer or speed indicator. This is a precision instrument for measuring r.p.m. and f.p.m. and a tachometer of the chronometric type.

Wiring Guide (1130)

Publication of a new catalogue and wiring guide has been announced by the Wiremold Co. More complete than previous editions, this publication emphasizes wartime industrial applications of Wiremold products and includes new items such as a polarized receptacle and a universal-type receptacle designed to take plugs with either parallel or tandem blades. Also included are instructions and information on the installation of Wiremold raceways and fittings and Wiremold fluorescent lighting equipment for the use of electrical contractors, plant electrical men and wiremen.

Motor Fitness (1131)

A 36-page "motor fitness" manual has been issued by General Electric Co. Primarily designed for plants converted to war production, but applicable to all plants using a number of motors, the bulletin discusses how to get the most service out of old and new motors; "switching" motors from one job to another; equipping old machines with new motors; selection and application of motors, etc. A supplement explains how to save critical motor materials, including WPB recommendations, and information on the use of load-time-temperature charts.

Centrifugal Pumps (1132)

Centrifugal pumps are the subject of an 8-page bulletin released recently by Allis-Chalmers Co. Construction features, sizes and capacities are listed for easy choice of proper pumping equipment for specific needs. Included are single and double suction, single and multi-stage, mixed and axial flow, combined Allis-Chalmers units and special pumps to solve special problems. Recommended applications for the Allis-Chalmers Electrifugal unit are included also.

V-Belt Care (1133)

"Plain Facts on Wartime Care of Rubber V-Belts," another of its maintenance handbooks, has been published by Allis-Chalmers. The book begins with the anatomy of a V-belt and principle of the V-belt drive and ends with post-mortems on damaged V-belts. How to obtain proper tension, what to do about worn sheaves, what determines the life expectancy of V-belts are some of the subjects treated.

Signalling Equipment (1134)

A catalogue of industrial signalling equipment is being distributed by Schwarze Electric Co. This book consists of loose leaf sections, each in a different color and with each section and page indexed. To meet the problem of changing conditions in a single plant, the company reports that it has developed a system of interchangeable signals which may be plugged into uniform adapter plates.

ELECTRICAL WEST, 68 Post St., San Francisco, California.

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* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

GOOD LIGHTING

Gets Them to the Fighting Front

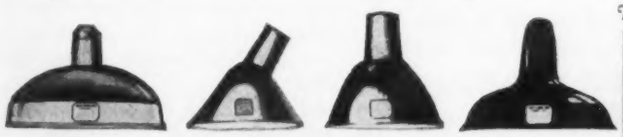
FASTER!

★ The job of supplying our fighting forces with an endless stream of airplanes. ships, tanks, guns and ammunition must not falter. Any plant improvement that will speed production . . . get more output from available skilled workers . . . is both a patriotic duty and a sound investment.

Good lighting is a first essential in maintaining worker efficiency and morale. It helps good eyes do more work more accurately. It enables older workmen to perform tasks that otherwise are beyond the capabilities of their dimming vision.

Adequate lighting—directed for maximum efficiency and energy conservation depends to a large degree upon the basic design and construction of the lighting equipment. Play safe by specifying lighting fixtures bearing the RLM LABEL. This label is your assurance that the fixtures so identified have been tested by Electrical Testing Laboratories; are certified by this independent organization to meet rigid specifications essential to high efficiency, economical operation and maintenance, and ability to withstand vibration and heavy duty service.

Only Industrial Lighting Units built to exacting RLM Specifications are permitted to carry the RLM LABEL. Write for complete set of RLM Specifications, and booklet, "The Meaning of the RLM LABEL".



RLM Silvered Bowl Diffuser | RLM Symmetrical Angle Reflector | RLM Deep Bowl Reflector | RLM Dome Reflector

The Letters RLM Stand for Reflector and Lighting Equipment Manufacturers

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ELECTRA'S HUSBAND

This War of Nerves

IT'S EASY to tell when Electra is mad. You husbands know the symptoms—lips in a thin tight line, a slight flush high on the cheeks, a menacing gleam in the eyes. When these storm flags fly someone usually has been panned or is about to be "told off," to use a phrase Electra picked up from a girl from Kansas. So I was not surprised when she started firing words as I walked in the door one evening.

"What's the matter with the oil companies?" she asked. "They were the great *service* organizations. And what happens now? I drive into our station and find one man and a green girl trying to run the place. Five cars waiting for gas. A car on the grease rack. A couple of flats to be fixed. And the two of them running around like crazy people. I can't get our car greased until day after tomorrow. I have to get out and take the lid off the gas tank, and put the hose in. The girl doesn't know which side of the hood to open to check the oil. And she isn't strong enough to take the cap off the radiator. Can't the people who run that company manage it any better than that? I'm going to write 'em a letter that will burn 'em up . . ."

"Now cool down," I interrupted, "before I wash your face with a cold rag like you used to do with Junior. What else happened to set you off?"

"Nothing," she answered. "It's just that I get hot about the way businesses and the people who run them break down when an emergency comes along."

"Listen, my dear," I said. "You are right now a walking example of the fact that the war of nerves has arrived in this country. That's first-rate Axis propaganda you're spouting. Hitler and Hirohito would like to hear more of it.

"Did it ever strike you that the people who are running the oil companies have their hands full? There were two more tankers torpedoed off the Coast last week. There's the fuel oil shortage in the Northwest. The oil people and the railroads are doing a great job moving fuel oil in tank cars. Like everybody else, they are having their manpower troubles—men going in the Army and Navy and others leaving for better paid war industry jobs. To top it off they have to produce to deliver the gasoline for all of the tanks, trucks, jeeps and planes of the Army. The men who run those companies are performing superbly under circumstances that would try the heart and temper of a lion. Give them a break before you start beefing."

"I didn't think of that," she mused.

"You should have, as bright as you pretend to be," I cracked. "It's criticism like yours that is going to pit one element of our people against another and that's just what the enemy propagandists want. In the diner going to Los Angeles the other day a fellow—a business man too—was criticizing the railroads because they couldn't get the Lark into the station on time. He said the government would do it, if they were running the roads. Maybe he forgot about the last war when the government did run them. Maybe he never had heard of the magnificent job the railroads are doing hauling troops and supplies. Maybe he had no business making the trip himself. But certainly there was no occasion for him to gripe about the management of the railroads."

"That kind of stuff doesn't do any good does it?" Electra said. "I guess we ought to keep still about it. When you stop and think about it, we haven't made any personal sacrifices yet. We don't drive as fast as we did but that's an economy. You don't get bacon for breakfast every morning. We buy some bonds every month. And we'll have a whooping income tax to pay."

"And after election you'll find that it will get really tough," I said with a fervent hope that this would not set her fuming again. It didn't.

GENERAL DEWITT'S order modifying the dimout along the Pacific Coast brings to mind a letter Electra received from a friend visiting in New York contrasting conditions there with those in Western cities. Here are the pertinent paragraphs:

"This isn't New York—at least not the New York you know about, especially after dark. At night it's a place of deep, dark, dismal canyons populated by dim-eyed scurrying, hooting monsters that chase you from curb to curb. No street lights except dimmed-out ones at corners that are so dark one can't read the street numbers. All cars travel with parking lights only. Traffic signal lights are vague tiny crosses that you can just distinguish if the night is black enough.

"Broadway and Times Square are just ghosts of their old selves. For a few minutes between dusk and dark signs blaze hopefully and courageously and then go out like the Arabs. At about nine a keen eye can barely distinguish the smoke rings blown by the soldier painted on the Camel sign.

"You know how I like to window shop. The first night in the big city I set out from the hotel to 'do' Fifth Avenue. Walking down Fiftieth Street I crossed the dog-goned avenue and wound up right in the center of Rockefeller Plaza without knowing where I was. Not a light in a window.

"Back home Broadway in Los Angeles or in Portland, Market or Geary in San Francisco or Third or Pike in Seattle all blaze like Great White Ways in comparison to the streets here.

"Oh yes, I almost forgot. They dim out the subway trains. That in my opinion is going just a bit too far!"

BEST line of the month was one I repeated to Electra after a visit to the San Francisco Electric Club. It came from Willard T. Chevalier, publisher of *Business Week*. He said:

"There are no second prizes in a modern war."

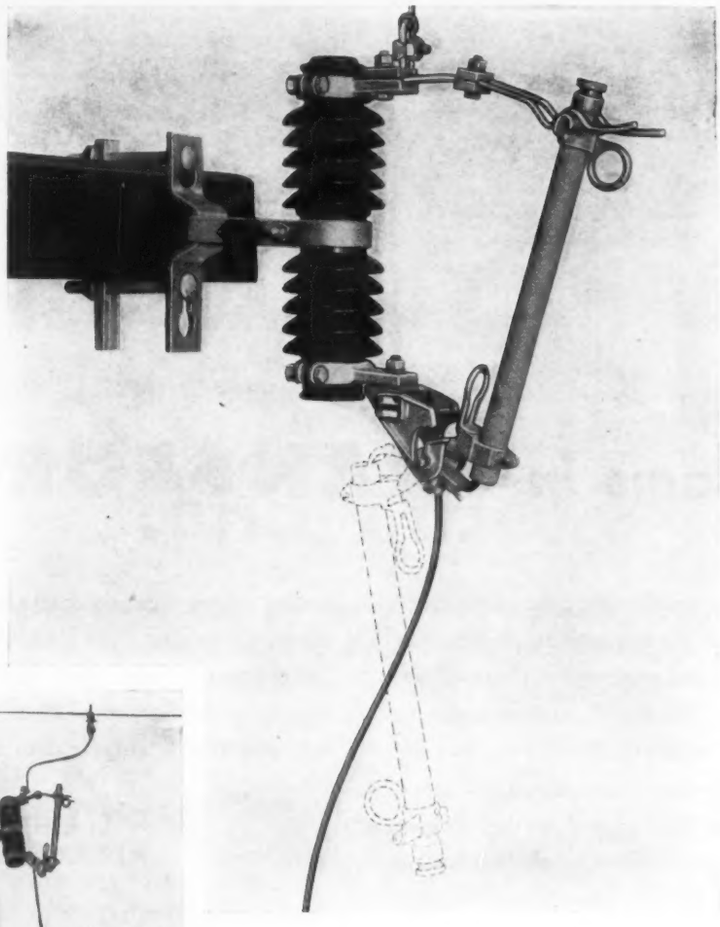
YOU who read all the ads in the magazines may have seen this one. Electra clipped it from a recent book. She said even though it was written specifically about people in the Bell Telephone System, to her it typified everyone in the utility business. A long distance operator wrote the poem:

We are the unseen, ever watchful, never sleeping,
Binding the atoms together.
Not ours the glory nor applause,
We wear no uniform and yet are a part of our land's destiny,
Guarding her secrets well.
We are the unseen, loyal, true to an ideal,
One God, one country, one flag:
We want no praise, knowing, out there,
Men have shed their blood that we might live . . .
With others soon to follow them.
Our reward shall be, one day, with the touch of magic at our finger tips
To send across the quivering wires
One far-flung cry—"Ours is the Victory!"

LOWEST TENSION DROPOUT
MATTHEWS FUSWITCHES

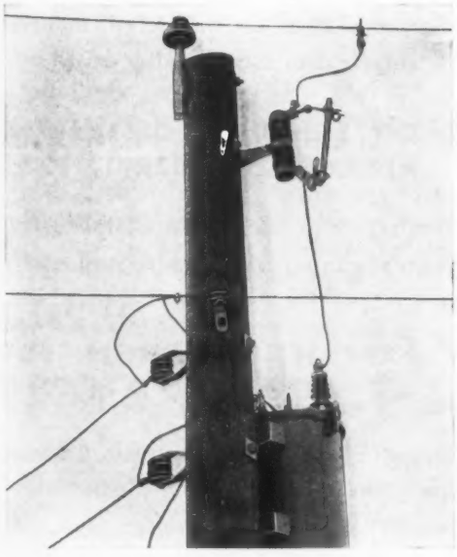
Rugged

Nothing Flimsy About Them



Low Tension Prevents Fuse Link Breakage

Catalog 1452-4 on Crossarm



Mounted on pole by means of through bolt or lag screws.

Single Insulator Style in three sizes: 5, 7½ 12½ and 15 KV, all rated 100 Amperes.

Also made in four sizes with two insulators.

Where your war efforts require Open Type Dropout Cutouts, these single insulator Matthews Fuswitches are available for prompt shipment on proper preference rated orders.

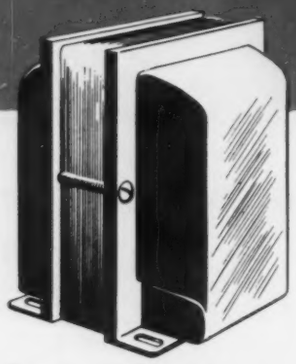
The quick, unfailing clearance of faults; the sturdy design and construction with strong highest quality materials; the simplicity and ease of operation, and many other superior features assure you of the lowest possible **TIME COST.**

Bulletin 102 illustrates and describes the efficiency and money saving possibilities of these single insulator Matthews Fuswitches and their companion 2-insulator types, as well as all other Open Type Matthews Fuswitches. A copy will be sent promptly on request.

W. N. MATTHEWS CORPORATION

Engineers and Manufacturers Since 1899

ST. LOUIS, U. S. A.



THERMADOR

A FAMOUS NAME IN ELECTRICAL PRODUCTS

A New Name in TRANSFORMERS

THERMADOR is well known in the field of electrical appliances—well known for engineering and quality built into numerous products serving the electrical industry all over America. Thermador now expands its services into the field of transformers.

Thermador combines the machinery, dies, equipment, inventory and many of the personnel of the well-known Los Angeles Inca Division of Phelps-Dodge Corporation with the facilities of their modern plant and now offers the industry transformers for radio, sound, public address, television and geophysical applications.

THERMATITE TREATED TO WITHSTAND HUMIDITY and EXTREME HEAT

Thermador transformers are Thermatite treated, which is a well tested and approved form of impregnation. This treatment, proved on thousands of transformers under severe climatic conditions, gives these units the resistance to constantly withstand extreme conditions of humidity and heat. This is particularly important at this time with their widened use in foreign countries where extreme temperatures and humidity exist.

ON SCHEDULE DELIVERIES AFTER NOVEMBER 1, 1942

Thermador transformer division is in complete and efficient operation and in a position to bid on priority requirements.

EXPERIENCED ENGINEERS AT YOUR COMMAND

Consider Thermador Electrical Manufacturing Co. your source of assistance in engineering and production of transformers to meet your specific requirements.

THE THERMADOR TRANSFORMER LINE
Included in the Thermador Transformer line are audio, auto, geophysical, bias supply, bridging, cathode modulation, coupling, driver, field supply, filament, high fidelity audio, input, midget plug-in audio, mixing and matching, modulation, output, plate, power (combined plate and filament), television, and tube-to-line transformers. Also manufactured are filters, chokes, and reactors (audio and equalizing).

THERMADOR TRANSFORMERS

THERMADOR ELECTRICAL MANUFACTURING CO.
5119 S. Riverside Drive, Los Angeles, Calif.

REPRESENTATIVES—Les Logan, 530 Gough St., San Francisco, California
Verner O. Jensen, 2607 Second Avenue, Seattle, Washington
M. J. Klicpera, P.O. Box 3113, Houston, Texas

"Seven Leagues Ahead"

ELECTRICAL WEST

NOVEMBER, 1942
VOL. 89 NO. 5

Thrice Armed

Men from this company who go to war are armed first by their nation, second by their cause, and third by their company in its assurance of protection of their families as well as encouragement and cheer

IT does not have to be done, of course. Nothing in the rules requires it. Even books for executives on public and employee relations do not suggest it. But because it eminates from a warm sense of humanity and sympathy, it probably creates a loyalty for his country and himself that none of the "techniques" could produce. Besides it fortifies those who go into war from that company by giving them a comforting sense of security for those they leave behind. It must make all the difference in the world in the way they can fight for their nation and what it stands for. There is real meaning to them in the American way of life, when this is the way it works.

For reasons as natural and simple as the actions themselves, the company name and that of the president may as well be another "military secret." It might only serve to distract from the rightness of *what* is done to talk about who is doing it. After all, the purpose in reporting it here is to stimulate the same human feelings that must lie covered bashfully in most sincere executives, to give them example and pattern to do what they might like to do themselves for their own personnel.

What is this all about? Even that is so subtle that it is not easily defined. While it is "a personal follow-up" of the entry of employees into the United States armed forces, it stems from a philosophy like this:

"How is it," the president of this company was asked, "that you can find time to attend to this yourself? In most companies someone else in the company would be assigned the job of calling on the families of everyone who goes to war, not the president of the company."

"It wouldn't mean the same thing," he replied. "When you stop to think about it, this is one responsibility that I cannot delegate to others, just because of the very personal nature of it. All of the other company details and functions I can assign to capable men or women in the organization. That is why we have them. That is what they are trained for. It develops them and the company.

"But in dealing with the public, the employees and our customers, there are certain relationships that are the president's responsibility. No one delegated to handle them can mean quite the same to the person dealt with as the president himself. Not because it is I or any particular man, but because he is president, the responsible head of the company. That is why I find time to take care of this myself and turn over to others most of the technical responsibilities most presidents take to themselves. To my mind this is the most important thing I can do for the good of the company and the community."

This assurance was written to the men in the armed forces, former employees of the company:

"Your mother or wife has been advised that if occasion arises in which your family needs emergency help or advice she may confer with this committee (of the company employees association) which will render aid, assistance or advice. You may therefore be assured that your family will not be in want or distress during your absence."

Most companies give their employees a leave of absence when they go into the armed forces. Whether they do or not, they are tacitly expected to do so by the government and the force of public opinion is such that they must do so. Therefore a mere leave of absence is nothing different.

Some companies give those who leave a bonus of some kind. It is not required, of course. Other companies seek to keep in touch with their employees in the armed forces by sending them the company employee magazine.

Everybody Does It—But—

Nearly all utilities recognize those who have been with the company certain stated numbers of years by presenting pins or badges. These are all in the category of "techniques." But it is rather in the way these things are done and by the president himself that distinguishes this particular organization.

In this company a leave of absence is given all employees who have been with the company more than a year. Likewise a bonus is given. This was authorized recently by the board of directors and was made retroactive so that those previously in the service would receive one also. Now the recipient of the bonus is handed it in a purse at the time he leaves. He is asked by the president to come to the latter's office and bid him goodbye. The bonus is then presented to him with the good wishes of the company expressed by its chief executive.

It was to send the bonus to those who had already departed that this president developed his personal follow-up. At first the bonus purse was merely sent with a letter from the man's former department head. This unexpected present brought back letters of thanks from the men and indicated their continued interest in the company and its people.

When the company won some awards the president thought these ex-members of the company might like to know about them. Meanwhile, too, a committee of the employees association had been set up to take care of the family of anyone in the armed forces should they be in need, want, or become victims of bombing. This was information that those in the armed forces should know, for it would relieve their minds of concern over their families, put an end to worry that might of itself sabotage their efforts.

From this first letter to employees in the armed services began what is now a monthly personalized way of keeping in touch that is unique in many respects, and not the least of the respects is that the president of this company has assumed the job of maintaining the contact himself.

The Memento Book

Officially to declare itself upon the leave of absence, a form was prepared, carrying the company seal and telling of the conditions of the leave. It was then thought that this document could be made the beginning of a memento book in which the man's family could keep other records of his military career. Such a book was printed up.

It contains the man's name printed or lettered on the front cover. Inside is space for a photo in civilian dress. Then comes the company's official leave of absence signed by the president. Following are pages for photograph in military uniform, personal data as to entry in military service, and from there on pages for a chronicle of his military life to be recorded by his wife, mother or friend.

There are pages for reflections from first camp or station, for recording advancements in rank, movement to other camps, mementos of travel in the United States and in foreign lands, citations and honors, highlights of service, a page for names of friends made in the service and finally a page for recording the honorable discharge at the termination of military service.

A book is merely a piece of printed matter unless it becomes imbued with personal significance. That significance is bestowed upon this service record book by the president in his manner of presentation. He makes a personal visit to the home of the wife, mother or friend of the man given leave for military service. He personally presents it, explaining its possibilities. He presents to wives and mothers a simple blue and gold service star and explains to them the existence and purpose of the employees' association committee to advise or help them in case of need.

One mother in a letter of thanks sent him a copy of a picture of her son in uniform suggesting that it might be kept in the company's memento book, and it started such a book for the company too. Now each man in the service is asked for a similar picture.

Communication Lines Kept Open

So much for the send-off to war. What of the continued communication between company personnel and their former associates now off in the armed forces?

Nearly all companies send the company employee magazine to their war absentees. This company does so too, sending them by first class mail to expedite their delivery and assure their forwarding. But in addition to this once-a-month employee magazine, this president decided that the letter he had sent to acquaint his on-leave employees of the honors the company had won and which he felt belonged to them as well, could become a regular monthly letter. It could be much more informal, cheerful, breezy. It could go forth in between issues of the company house organ to lessen the loneliness of absence from home.

To cover the several hundred such on-leave employees meant that the letter would have to be duplicated in quantity. Therefore it was made into a special little publication, multigraphed, much less formal, full of jokes and gags, humorous incidents, gossip, nonsense, inspiration. What is more, the president is its "boss," its editor, for it is his personal message to those in the armed forces.

Personnel officers of the camps in which many of these men were stationed, on learning of it, have asked that copies be sent to the reading rooms, libraries and USO. These are now being sent. The commanding officer of each received a letter from this president, in military form, apprising him of these copies. He even solicited stories for the paper from the recipient. (And has been getting some too.)

In order to stimulate participation in this link of communication between company and men in the service employees were asked by the president to clip from the local newspaper a weekly feature, a summary of the local news of that week, to be sent to the men with a copy of the president's letter-paper. Letters to the men are urged in each department. Letters from the men are circulated for others in the department to read.

Women working for the company who have husbands or brothers in the armed forces have likewise been given copies of the memento book in which to keep a record of similar nature.

Bare enumeration of the things done somehow does not convey the spirit in which they are done. Things done may be considered "technique," but the way and the spirit in which they are done in this company transcends technique. Just as in most companies employees who have been with the company five, ten, fifteen, twenty years are given a pin or badge. That is technique. In this company the five-year pin is given by the president himself at his office to the "new" employee, but for the ten, fifteen, twenty or more year pins, this president feels that the man is entitled to be brought the pin in person to him at his job and by the president of the company in grateful acknowledgement of his service during those years.

There is *that difference* to it.

Construction—Builder of Bases

America's Great Peacetime Industry Goes to War

PUNCHED through 1,600 miles of trackless wilderness and rivaling the Panama Canal in strategic importance, the Alaska Highway will cut days and dangers from present supply routes . . . to Alaska . . . to the Aleutians . . . yes, to Japan itself!

This job, to be finished soon and well ahead of schedule, is but one example in thousands illustrating how construction sets the stage for our war effort . . . and why the construction engineer is vital to victory.

Back of America's busy production lines, expanding shipyards, growing cantonments and far-flung military bases is a series of swiftly executed construction jobs. Important jobs! ***For the construction industry is a builder of bases. Bases for production—for training—for defense—and for attack.***

To conceive and to carry through so tremendous a program in a race against time is typically American. It requires enterprise and the sort of versatility that has been acquired by undertaking every kind of job; from a Boulder dam to a drydock, from a Pennsylvania Turnpike to a housing project, from a Radio City to a railroad tunnel . . . and taking it in stride. War's demands in the eyes of America's construction men, are simply more of the same—for a grimmer purpose, and under heavier pressure.

The civil engineers who develop the necessary designs, the contractors who execute them and the manufacturers who provide the equipment and materials, are as much a part of this war as are the men who face the enemy. The results of their labors are recorded in mounting production figures, and will be indelibly written in the military annals of this war. Those 60,000 airplanes, 45,000 tanks and 8,000,000 tons of shipping that the President asked for in 1942 will be supplied because—and only because—the construction industry did a Herculean plant-building job first—and fast.

Yes, construction, America's great peacetime industry, has gone all out for war. From a normal 6½ billion dollars in 1938, it got into its war stride last year with a 11½ billion dollar volume. And under the impetus of Pearl Harbor, the 1942 figure now promises to reach the unprecedented total of 15 billion dollars. "If buildings would win the war, Hitler would be licked now", said Lieut. Gen. William S. Knudsen recently. Which emphasizes the further fact that the construction industry was the *first* to go to war.

The technical and managerial talent that is accomplishing this mammoth job has had to find its strength and resources within itself. No possibility of "conversion" here! Only years of varied construction experience enabled it to tackle and to achieve the manifold tasks that building for war demands.

Take that cornfield, for instance, that Henry Ford picked for his record-breaking bomber plant. The spring mud was soft and deep when contractors moved in last year. They were entering a race against an almost impossible time limit. Before they could even begin on the plant itself, they had to build roads, lay a 4-mile water supply line and install a complete sewerage system with its disposal plant. But such varied jobs—each big in its own right—merely were antecedent to running up the framework and enclosure for the 60-acre factory itself. Or to using road-building methods to pave a floor that was the equivalent of 25 miles of 20-foot wide concrete highway.

It was a race against the approaching winter, and to win it they had to push their $1,000,000 worth of construction equipment to the limit—day and night. But win they did! It is accomplishments like these that explain how the nation's aviation factory floor space jumped from 18,000,000 to 60,000,000 square feet in

This is the fifth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

the past two years . . . why Fortresses and fighter ships are beginning to turn the scales of war in our favor.

"Somewhere in the Southwest" the Army called for a training base. The contractor who answered that call summed up his performance in characteristic fashion: "Beginning without so much as a contour map we had a $10,000,000 project ready for operation within 90 calendar days, and saved 3½ million dollars of the estimated cost".

At another Army camp a contractor assembled a crew of 20,000 men who put together 1,400 buildings in 125 working days, along with a sewer system, a water-supply and a street layout of which many a fair-sized city might be proud. This job swallowed up 2,000 carloads of lumber, and 26,000 kegs of nails. So perfect was the teamwork, from the general manager down through the hundreds of superintendents and foremen to the specialized crews, that as many as seventy buildings were erected in one single day.

But versatility and experience are not the only qualities that the construction engineer has in his tool chest. He has ingenuity, and he needed it when steel, copper, zinc and aluminum had to be used for combat equipment, and were denied him. Great hangars, conventionally of structural steel, were turned out with record-breaking timber arch spans. Reinforced concrete factories were designed to require only 3 lb. of steel bars per square foot instead of the customary 5 lb. Asphalt-impregnated paper was substituted for copper in flashings, cement-asbestos for galvanized steel in duct work. In the face of a materials shortage, he continued to build bases—safely, economically, and on time.

Construction ingenuity, too, is back of the records in Liberty ships, in war housing and a host of other facilities. Indeed, it was the construction industry that stepped forward to assume the bulk of the emergency shipbuilding program, leaving established yards free to handle more specialized Navy work. Naturally, it was easy for civil engineers and contractors to build the shipyards, but building ships was another story. It is a far cry from steel ships to conventional engineering structures, yet, drawing upon their bridge and building experience, the men of construction have turned out ships faster than they were ever built before.

How was this possible? . . . because the construction man sees every job as a new problem, views every precedent as something to be discarded in favor of something better. So instead of assembling the myriad separate pieces of each ship on the ways, he fabricated them into huge built-up sections. These he swung to the ways and welded them into place in a fraction of the time required by old methods.

Again, the demands for wartime housing for workers in industrial areas, at Navy bases, and near Army concentrations, have altered the meaning of "residential construction". The building of individual houses has given way to a form of multiple-unit project that calls for the skilled services of the architect, the civil engineer and the large contracting organization. On one such project, for example, a contractor experienced in large building and bridge construction employed an extensive system of prefabrication and site assembly that made possible the completion of 5,000 houses for war workers within five months.

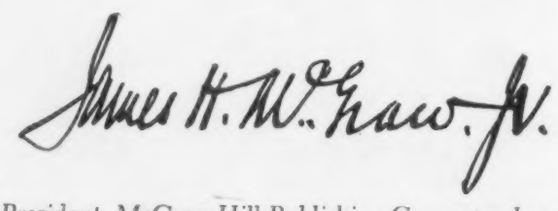
All these activities, within the United States, parallel the achievements of other industries that serve the men at the front. But construction knows no continental limits. Its men are serving throughout the network of defense bases built in the West Indies, Greenland, and Iceland, and in the offensive bases that are taking form in the jungles and deserts of Africa, the harbors of the Persian Gulf, and the plains and mountains of Australia and Alaska. Already in this war, as in the last one, construction crews, like those at Wake and Guam, have dropped their peacetime tools to fight shoulder to shoulder with their comrades in uniform. Construction follows the flag to the farthest outposts in this global struggle.

* * * *

But while the construction industry thus serves the special needs of the armed forces, it must look after its job at home. It must keep the highways serviceable, the water supply safe, sanitary facilities adequate. There are home chores that cannot be neglected even in war.

And when we finish our No. 1 task of winning the war, the construction industry will again be called upon to help re-establish peacetime employment and to stimulate the normal industrial activities of the nation. It will raze, redesign and rebuild; it will bring modern sanitation to urban dwellers; it will safeguard fertile areas and cities from disastrous floods; it will improve all forms of transportation; it will design and build the facilities that will be needed to reconvert from war to peace. Its vision, versatility, experience and ingenuity will be as indispensable then as they are vital now.

Today it is building the bases that are needed back of every battle-line. Tomorrow it will build for a new and better era. Today it is laying the foundation for the victories that must be ours. Tomorrow it will lay the foundation for the peace that will follow these victories. In war and in peace the construction industry is the builder, the harnesser of nature's forces.



President, McGraw-Hill Publishing Company, Inc.

Wartime Housekeeping

Review of operating procedures designed for emergency conservation of time, manpower and materials; substitution and salvage save critical materials and preserve service efficiency for Pacific Gas and Electric

By Earl M. Seel

Pacific Gas and Electric Co., San Francisco

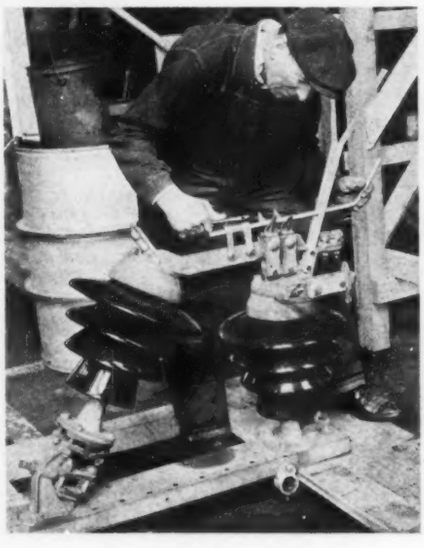
HOW public utilities are meeting the present emergency in the conservation of metals and other vital materials and are streamlining operations to contribute maximum efficiency, is exemplified by current practices instituted on the system of Pacific Gas and Electric Co. Wartime housekeeping might be a comparative term for these practices. They are similar in many respects to the economical activities of the housewife who is operating the family household in the face of war-emergency rationing.

Because of the magnitude and character of its business, PG and E normally is a large user of various metals such as steel, iron, copper, aluminum, bronze and brass. Also it uses large quantities of other supplies and materials—all necessary to meet the needs of its diversified operations. Today, naturally enough, these same metals and materials required to provide utility service, are equally important in the manufacture of ships, airplanes, guns, tanks, ammunition and other instruments of warfare.

So company engineers have been compelled to cut corners and improvise with available obsolescent and scrap materials. Many innovations have been put to use which have materially increased service efficiency.

One of the principal items accumulated on the company's system and sold as junk, is used, rusty and damaged pole line hardware including bolts, nuts, lag screws, pole step pins, cross-arm braces and other articles. Recently, conservation-minded engineers discovered a virtual mine of metal wealth in this scrap hardware. It is now being accumulated in the division store yards and periodically forwarded to the central warehouse. Here it is segregated and every item susceptible of salvage is renovated. Stubbing bands and cross-arm braces are straightened and then galvanized. Machine bolts are trimmed up on emery wheels and the threads re-run. If the bolts are beyond repair, then the nuts are salvaged. Conductor clamps are cleaned and re-galvanized. Now, nothing usable is sold as scrap.

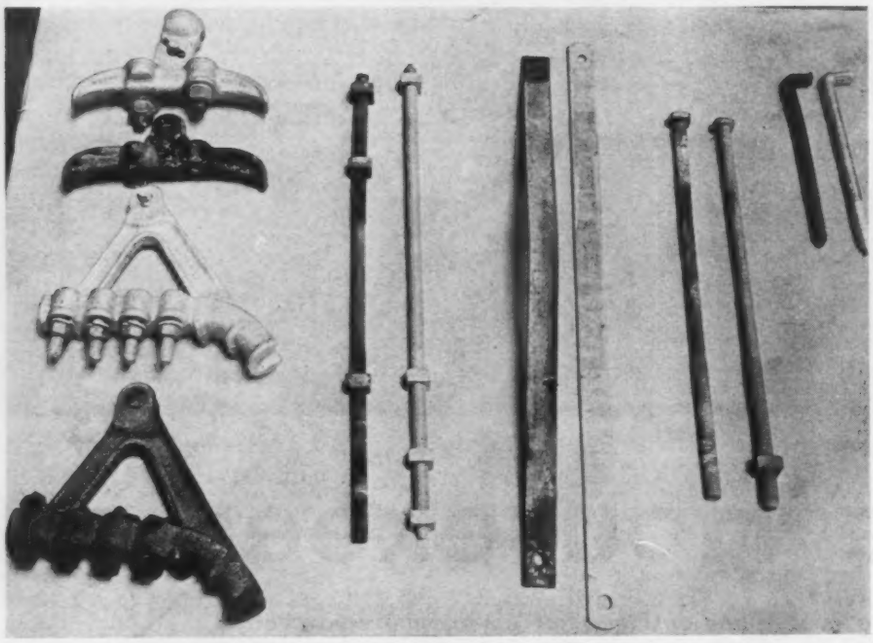
Sold as junk, this hardware (above left) is now salvaged and reused. Paper cartons (above right) are also reclaimed. The switch (below) was assembled from parts mined from a station junk pile



PG and E, like other public utilities, is a large user of steel plate. Since the war needs have limited the supply of this material it has been found possible to obtain usable stocks by reclamation of what was formerly disposed of as steel scrap.

Company engineers are reclaiming steel plate from transformers that have been discarded because of damage or obsolescence. The reclaimed steel customarily is ¼, ⅜ and 7/16 in. thick. Workmen use oxyacetylene torches to cut the tanks into usable sections. These sections are then sent to a steel fabricating plant where they are rolled flat. The plate of various gauges is then stored until needed. By this means, the company has been able to secure a sizable supply of steel plate for the manufacture of tanks for oil switches, underground junction boxes and other purposes.

A successful technique has been developed for salvaging copper tubing taken from the cooling coils of transformers that have been junked because of damage or conversion from water to air-cooled. Usually this tubing is in extremely bad condition when salvage is attempted. It is dented, twisted, and, when taken from transformers which have been located in territory where hard water is used for cooling, there



Scrap hardware was formerly sold as junk. Now it is classified as to usefulness, cleaned and re-galvanized

is heavy accumulation of lime deposit which is difficult to remove.

At the company's central warehouse and shops where the transformers are sent for salvage, it is the practice to make individual chemical analyses to determine the deposit or scale. Then it is possible to select the proper solvent for removing the deposit. The solvent is placed in the tubing under pressure until the lime dissolves. In extraordinarily bad cases of scale it is sometimes necessary to use pure muriatic acid as a solvent.

After removal of the lime deposit the tubing is straightened, annealed and then refabricated into new transformer cooling units.

In these days of potential shortages metal is not the only material salvaged for re-use by PG and E. The company operates about 175 sub-stores located in 766 cities or towns of northern California to which it supplies service. The shipment of materials and supplies of all kinds from the central warehouse to these sub-stores, and trans-shipments between the sub-stores themselves, calls for the use of many paper cardboard cartons as material containers. Prior to Jan. 1, 1942, new cartons were used in all shipments. Since that date all sub-stores have been instructed to accumulate and forward to the central warehouse all used cartons, regardless of their condition. These cartons are then reconditioned and sent back into use.

Steel is No. 1 material on the critical list. PG and E obtains plate stock by cutting up old transformer cases and sending the pieces out for rolling

The most amazing thing of this practice is the fact that only a few cartons have to be scrapped because of their damaged condition. Results of this salvaging program have been excellent. Since the practice was initiated no new cartons have been purchased.

In order adequately to carry out its many service functions, PG and E operated in 1941, a total of 6,670 passenger cars and 1,771 trucks. To provide service and repairs for these cars and trucks 24 major garages and repair shops and several other storage depots are maintained in various cities of northern California. To conserve rubber, gas, oil and automobile equipment the automotive department has initiated a variety of steps. These have resulted in a reduction of car mileage between 25 and 40%.

The department met conditions resulting from the loss or anticipated loss of personnel by reviewing the functions of its maintenance organizations and developing plans for centralizing certain classes of maintenance work which had been conducted on a decentralized basis. Cost reports were revised to eliminate all non-essential records and to reduce the work of compiling essential records. As an example, reports formerly prepared quarterly are now to be prepared annually.

A number of important changes were made for economy in the use of tires. The measures adopted were as follows:

1. The removal from service of all non-essential vehicles.

2. All non-essential mileage in the case of essential vehicles has been eliminated.

3. The increased use of pooled cars instead of assigned cars.

4. The substitution of public transportation and bicycles for automobiles wherever practicable.

5. Non-essential activities of the commercial and operating departments have been discontinued.

6. Instructions have been issued to all drivers calling for car operation at reduced speeds and moderated acceleration and de-celeration rates. In some instances, governed speeds have been lowered to a maximum for light cars of 35 miles per hour and lesser speeds for other types. These instructions have resulted in the saving of tires, gasoline and repairs.

7. Frequency of inspection has been increased in order to minimize abnormal tire wear. Service men as well as mechanics have been instructed in methods of recognizing various types of abnormal wear so that faulty conditions can be promptly corrected.

8. All worn tires are inspected for

causes of abnormal wear or failure and for possible salvage.

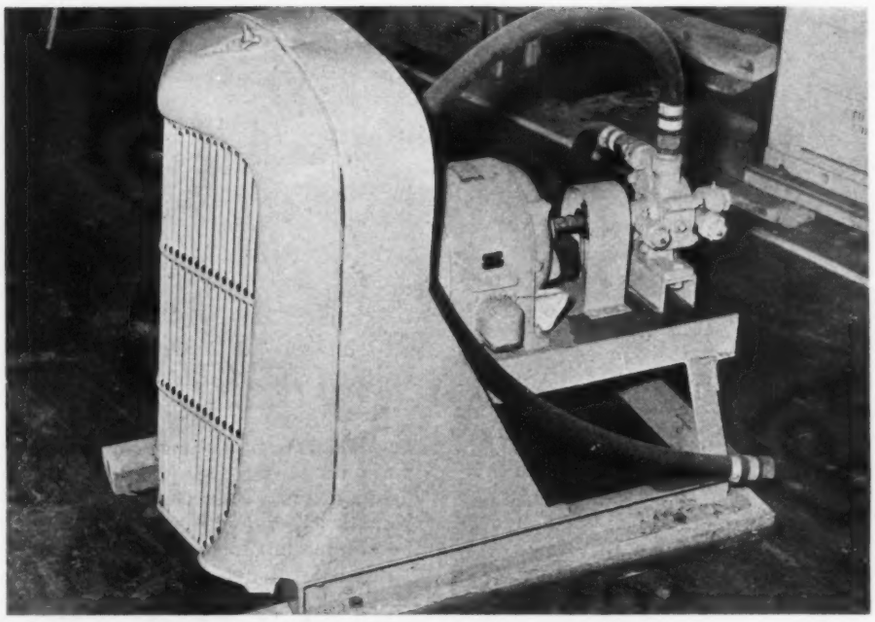
Company engineers successfully solved an emergency transmission line construction problem recently where the inability of manufacturers to guarantee delivery of specified switches threatened to halt the extension of vital service. The problem was met by converting some obsolete three-insulator type switches to the required two-insulator units. One reason for the conversion was that the three-insulator switches call for the use of double wood crossarm construction for mounting whereas the two-insulator unit needs but a single arm.

In making the change it was necessary to revamp certain of the switch mechanisms. This was done by using parts from the scrap pile.

At present there is urgent need for practical substitutions to take the place of critical and scarce materials used in steam plant operations. A number of machine parts and valve trims, which operate under high temperatures, require the use of alloys containing such metals as nickel, chromium, tin and copper. In some instances engineers have been successful with radical substitutions.

An example which gives promise of satisfactory performance is a 42-in. diameter salt water circulating pump runner made from cast iron instead of bronze. The runner is coated with a recently developed enamel which is resistant to both wear and corrosion. The cost of this particular job is about 60% of a similar unit using bronze.

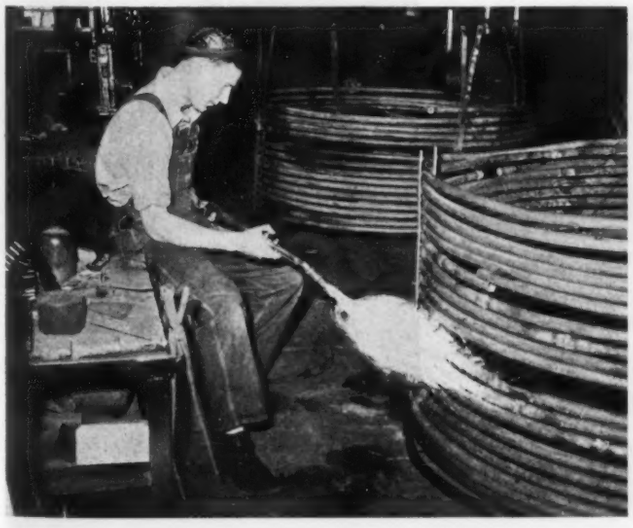
A novel device which applies external forced cooling to transformers and thereby increases their capacity is being used extensively. The heat exchanger consists of a Ford truck radiator and fan, a 2-hp. 1,800-r.p.m. motor and a small pump mounted on a common base. Connections are made to the transformer by means of Neoprene oil-proof base. The hot oil from the top of the transformer is drawn through the radiator, which is connected to the suction side of the pump, and discharged into the bottom of the tank. The top connection provides that oil cannot be drawn down below a safe level in the event of a leak in the radiator or piping. A check valve is installed in the bottom connection to prevent the transformer tank from draining by gravity.



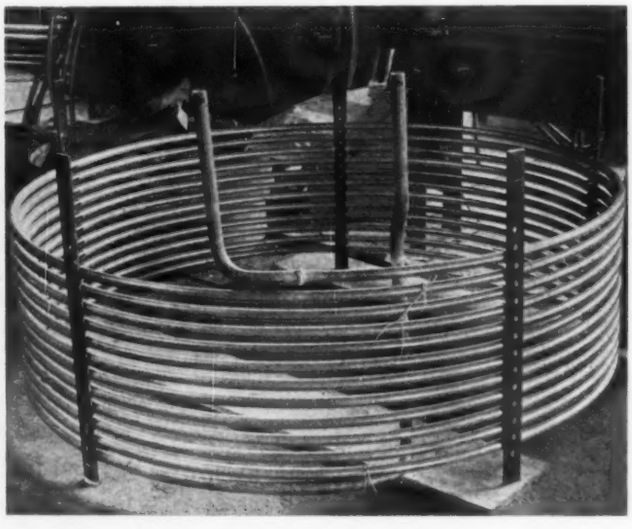
Transformer capacity is increased by installing this heat transfer unit into the oil line. A Ford radiator, a small motor and a pump are the principal parts

Some 24 of these cooling units are in operation on both water and self-cooled transformers. Four additional units are kept in storage for possible emergency use.

It must be borne in mind that many of these conservation practices that have been induced by necessity would not be practical under normal operating conditions. But in these swift-changing times of shortages in critical materials and the absolute necessity of conserving existing supplies, the term "salvage" acquires a new meaning without regard to monetary value. This new meaning finds expression in giving useful life to something hitherto of little worth. After all, the savings and economies practiced by the utility companies merely result from exploration and the workings of human ingenuity in the use of substitutes in order to free normal stocks for the nation's war efforts. The practices described are but a sample of what can be done.



Copper tubing from discarded transformers is reclaimed, straightened, annealed and restored to vital war service



The new penstock is shown back of the operator's cottage at Dalkena station

Plant Restored With Salvaged Penstock

Old penstock dismantled and new one fabricated for emergency repairs of Washington Water Power station

By N. W. Humphrey
Power Supply Dept., Washington Water Power Co.

WARTIME EMERGENCIES are causing radical changes in utility maintenance techniques. As a result many new and ingenious schemes are being devised to keep equipment in operation or to restore damaged equipment to service in the quickest possible time. A noteworthy example involving the re-use of material scheduled for scrapping recently occurred on the system of the Washington Water Power Co.

Early this spring following several days of heavy rains the hillside under and adjacent to the 18-in. wood stave penstock of the company's Dalkena hydroelectric station slipped away, carrying with it a portion of the penstock together with supporting structures. It was imperative that the plant be restored as quickly as possible. Although the plant was of comparatively small capacity (two 280-kva. impulse wheel-driven generating units operated at 450 r.p.m. under a head of 305 ft. with deflecting nozzle-type governors), its output is of particular importance during the dry season of the year when run-of-river stations are a vital factor in the maximum conservation of storage facilities. Furthermore the station is located near the end of a long transmission line serving important industries and it is needed to help maintain satisfactory voltage on the line.

Several solutions to the problem of restoring this plant to an operating condition were considered taking into account the need to conserve materials vital to the war effort, down manpower required and minimize the length of the outage. Any plans for repair or replacement of the old wood stave penstock were abandoned due to the age of the pipe and the deteriorated condition of the ends of the staves and to the difficulty in getting new pipe. A minimum of 60 days delivery with a higher priority than could be obtained from the War Production Board were the eliminating factors for this plan.

Purchase of new steel pipe was also ruled out due to the high priority required, delay in delivery, expense and because steel was one of the bottlenecks to increased production of materials for the war effort.

Consideration also was given to using materials on hand immediately available and not in use. At the old Monroe Street Station in Spokane there was a 7-ft. diameter steel penstock which had been out of service for several years. This penstock was scheduled to be dismantled and scrapped in 1942. The ¼-in. plate of which it was fabricated was found to be somewhat pitted in sections, but investigation showed that it was of sufficient thickness to provide a large possible factor of safety under the maximum pressure at the Dalkena plant. A representative section of the pipe subjected to various tests up to and including cold water pressure of 300 lb. per sq. in., over twice the maximum working pressure, gave very satisfactory results. Limitations of the testing apparatus prevented tests at higher pressures and these were not deemed necessary.

The two riveted plates composing each joint or section of this penstock, when cut along the edges of the plates with an oxyacetylene torch yielded four pieces of clear sheet steel 65 in. wide and ranging in lengths from 58 to 72 in. The plates were then rolled into cylinders at a local iron works so that the 65-in. edge of the plate formed the circumference of a tube approximately 20 in. in diameter.

At the company's central shop in Spokane these tubes were drawn up with clamps and the edges trimmed with a torch to form cylinders which, when butt welded, were 20 in. inside diameter. The weld was made by two passes of the electric arc using No. 5 Lincoln Fleetweld 3/16 in. coated rods. On the first pass the bead was laid in the joint to give practically full penetration. The final bead was made ⅝ to ¾ in. wide and was built up about 1/16 in. above the plate surface. The ends of the cylinders were trued with the torch where necessary and three of these short sections were then aligned on a length of 8-in. channel iron and welded together to form a length of pipe 15 to 18 ft. long. The inside of each section except for a short distance from each end was painted with coal tar paint. After welding the three sections together, the exposed metal at the joint was coated. When dry the entire interior was given a second coat of the same material. Two coats were also given to the outside before the sections were trucked to the Dalkena station.

While the pipe was being fabricated in Spokane, the right of way for the penstock at Dalkena was regraded to provide easier vertical curves, the gash in the hillside formed by the discharge from the broken wood stave pipe was filled and the old pipe dismantled and piled near the road to the power house to be salvaged for low pressure use elsewhere.

For the straight runs of the penstock

Steel for emergency replacement of a broken penstock was reclaimed from this 7-ft. unused penstock which was scheduled for the scrap pile for 1942

Here are sections of the 18-in. fabricated penstock ready for shipping (left) Reclaimed steel plate was trimmed in this yard (right) before being sent out

three or four of the 18-ft. sections were butt welded together in the fabricating yard at the power house and hauled up the hill with a double-drum electric hoist. Shorter lengths of pipe were cut at the proper angles to form the sweeps over the edges of the bench between the plant and the end of the flume above. These were set and welded in place. Two curved sections were made up complete for the rise over a rocky ledge where it was impractical to excavate at the joint to provide room for welding.

The inside surfaces of the joint welded when the pipe was in place were painted by a man lowered down the penstock on a special garage-mechanic-type creeper constructed for the purpose. The outside of the penstock was spot painted at points where the coating had been damaged in transit or during installation.

The connection of the pipe line to the wooden forebay at the end of the wooden flume was made through a slip joint consisting of a fabricated steel packing box packed with oakum and bolted at the bottom of the forebay.

Six of the old anchors consisting of timbers buried in the ground were used for anchoring the new penstock. In addition a 5-yd. concrete anchor block was cast around the pipe at the comparatively sharp curve at the foot of the hill near the power house. A half-yard concrete saddle and anchor block was also poured under the pipe at a low spot in the bench near the center of the penstock. The ¾-in. anchor bolts were so arranged that they would permit upward movements of the pipe when unwatered and exposed to the sun in warm weather. The pipe line was then covered for its entire length except at the upper end where it was supported on wooden bents at the entrance to the wooden forebay.

The fabrication and installation of the new penstock was completed at a lower cost than it was estimated new 18-in. wood stave pipe would have cost installed, and without the initial delay of waiting for delivery of the new pipe. There was no waste of material in cutting up the 7-ft. penstock beyond the scrapping of the 2-in. wide band containing the riveted joints. This waste however, went into the scrap metal pile being salvaged for the war effort.

By thus utilizing unused material which was being dismantled and scrapped it was possible to save delay in restoring the plant to normal, cut down the cost of the work and save the use of new material of vital use in the prosecution of the war.

Copper Status

Red metal, vital to utilities, is war's most precious; may determine munitions supply

UNLESS it flies, shoots or floats, it gets no new copper. In a sentence that tells the copper story. Every pound of copper available currently is going into direct military orders, shipments to United Nations or into the most essential industrial uses bearing preference ratings of A-1-a or better. H. O. King, chief of the copper branch of WPB. has recently summarized the copper situation. He says:

"Current copper supply, in excess of 200.000 tons per month, is the largest in the country's history. Domestic mine and smelter production is larger than ever before, imports exceed any previous year, and scrap collections are at a new high. Approximately 31% of this year's total copper supply will come from old and reprocessed mill scrap.

"The extreme tightness of the copper situation is demonstrated by the fact that copper currently used for domestic electric systems, communications, industrial motors and fittings, chemical plants, and all of the thousands of industrial and essential civilian purposes which must be met is much less than one-fifth of our total supply. Copper scarcity is further reflected by the recent announcement of the copper branch that even brass and wire mills and foundries would be allotted no copper of any kind, including scrap, except on preference ratings of A-1-a and higher.

"There is just one reason why we must have nearly five times as much copper this year as our mines produced in 1938. That reason can be found by examining the material being used to fight this war.

"A medium tank takes almost a half ton of copper; one type of scout car, 150 lb. One type of fighter plane uses over 800 lb., and the big Flying Fortress uses over a ton and a half of copper. A battleship uses two million lb. of copper. All these are front-line fighting tools. We must have them in great quantities, and they cannot be built without copper. That is where our copper is going.

"Ammunition is one of the largest users of copper. The shell casing on every shell from a .30-caliber bullet to a big 105 mm. shell is made of brass 30% zinc and 70% copper. Modern warfare burns up ammunition at a rate never before dreamed of.

"The copper situation can be summed up with the statement that it is quite possible that copper supply will determine the amount of munitions and war materials that we can produce in some of the major categories.

"Our attack on the critical copper situation has several spearheads. First of all, we have increased production tremendously—more than doubled it since 1938, in fact. Then, we are importing as much as we can. Two other war measures are the severe restriction of nonessential uses, and the substitution of other materials for copper wherever possible."

Photo Cell Signals

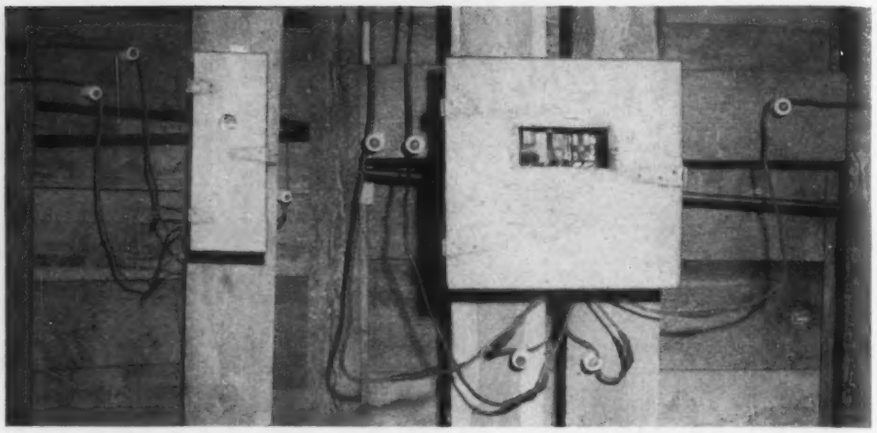
Electronic block system guides trains in driving 13-mile tunnel

PHOTO-ELECTRIC block signals designed and installed by General Electric engineers speed the traffic of men and materials in both directions through the Continental Divide tunnel. This 13-mile bore being drilled between Grand Lake and Estes Park in the Colorado Rockies, is a part of the Colorado-Big Thompson power and irrigation project.

The trains in the tunnel travel on a 24-in. gauge single track with passing tracks at convenient intervals. The function of the signal system is to indicate to train crews the presence of a train in the next section of the tunnel. In addition to preventing accidents, it has also reduced waiting time at passing tracks and has greatly increased the efficiency of all hauling operations.

Engineers were asked to design a signal system for the tunnel without mechanical or electrical switches connected to the rails. This was because water and dirt would tend to make maintenance costs soar, and because it is necessary to keep electric currents out of the rails to prevent premature ignition of blasting charges.

The track, therefore, was divided into blocks of about 6,000 ft., each block ending wherever a turnout occurs for passing. At the beginning and end of each block were placed two G-E photo-electric relays spaced about 30 ft. apart.



Light source portion of the signal system (left) and photo-electric relay (right) which guide trains through the Continental Divide water and power tunnel

The relays control the operation of red and green signal lights in that block. Each relay has two light sources located across the track, and spaced about 15 ft. apart so that only a locomotive or train can operate the lights. A man walking will not affect them.

All the green lights are on when the track in a block is clear. When a train or locomotive enters the block and interrupts the light beams directed on the first relay, there is no reaction, as this relay controls the already-lighted green lights. When the light beams directed on the second relay are interrupted, however, the green lights are extinguished and the red lights turned on. The reverse happens when the train emerges from the other end of the block.

Signal systems for three blocks have been in operation for several months on the east end of the tunnel, and the west end will soon be similarly equipped, to make this the longest tunnel in the world protected by photo-electric block signals.

When completed, the fifty-million-dollar Continental Divide Tunnel will bring water from the western slope of the Continental Divide to the eastern side, where it will be used for irrigation. In addition, immense qantities of power will be developed by the installation of turbo-generator units at strategic points. The project is under the direction of the U. S. Bureau of Reclamation.

Trains move forward from one block to the next as light sources and photo-electric relay shows "all clear" signal

Cable Inventory

Length, size and condition of all dead cable carried in plant account of utilities is to be reported to the WPB power division as the first step in putting this material into war work. Because cable in excess inventories under Order P-46 is rapidly disappearing and because it appears certain that suppliers will not be permitted sufficient materials to fabricate new stocks for utility use, it is now deemed necessary that inter-utility trading of some cable in ducts be resorted to so as to get cable for essential uses.

WPB has set up three classes into which cable is to be classified after inspection by utilities: (1) cable to be left in place for anticipated future load (expected within six months); (2) cable suitable for removal elsewhere; and (3) cable to be removed for salvage. Data are requested on the size, number of conductors, voltage, type of insulation and sheath and their condition and on length.

This is the first time WPB has asked for an inventory of material in plant account.

Manpower and Materials

Two predominant concerns expressed at all sections of Pacific Coast Electrical Assn. fall conclave, Fresno

WAR isn't pretty business. Its effect upon the electrical industry is not pretty either and its consequences, although unpredictable, are not the kind envisioned as the industry's destiny in happier years. It was to adjust sights to the necessities of war and to lay a course through its smoke to what is hoped will be clearer navigation someday in the future that the Pacific Coast Electrical Association met for its fall conclave at Fresno, Oct. 22-23. Under such serious circumstances it was an intense and thoughtful meeting, and exceptionally well attended.

President S. E. Gates, General Electric Co. Los Angeles manager, told the 254 registered, more than 175 coming from some distance, that the industry had a single responsibility in these times, to do everything it possibly can to win the war. Yet because the electrical industry has always planned for years ahead the conclave concluded with a session which projected itself into the none too bright future, the better to face it when it comes. Both R. E. Fisher, vice-president, Pacific Gas and Electric Co., San Francisco, who conducted the Friday afternoon general session devoted to the aims of the planning committee of which he is chairman, and W. C. Mullendore, executive vice-president, Southern California Edison Co., Los Angeles, the Friday noon speaker, looked at the future in view of the trends of today.

Mullendore, with skilled surgical incisiveness dissected the body of national policy. No surgical operation is easy to look at. The realities of war he likened to a major operation upon civilization, from the shock of which perhaps the patient might not recover, whether the operation itself was successful or not, and that the longer the patient is on the operating table, the greater the shock and exhaustion. War is wasting natural resources and manpower ruthlessly. The longer the war, the greater the impoverishment, the more difficult the recovery.

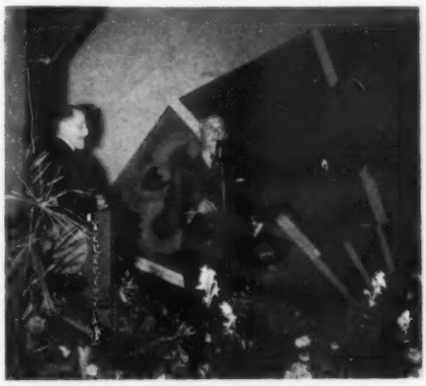
He debunked the easy philosophy that great need for products after the war would mean a real market. In China and India there has always existed tremendous need, but nothing of value to exchange for the products to satisfy such need. National debt created by taking natural resources and manpower to make goods that are consumed and wasted in war creates no wealth which can be later exchanged for new goods, he illustrated. Otherwise "we will be buying back our own notes, that is all."

Saying emphatically that we cannot afford the old American luxury of hiding from bad facts, he paraded an army of such unpleasant facts that are usually brushed aside. He showed the unmistakable signs of a change to a world order in which America could never again be isolated. The commitments of the President's "four freedoms" and of the Atlantic Charter were guarantees to the world of happiness and a high standard of living which America would be expected to supply.

One way in which the manpower shortage could be solved, and the war shortened, he declared, was to abandon the absurd restriction of a 40-hr. week on labor when no other nation on earth is so hampered. He urged positive and insistent demand on Congress to open up this reservoir of manpower.

Planning for the Future

As a man who has lost an arm takes stock of himself and adjusts his way of life to get along despite the handicap, the afternoon session dug into the rubble of the war to piece together what it might in planning for the future. R. E. Fisher outlined first the purposes of the PCEA planning committee and its personnel he introduced later as a panel to which questions and suggestions for its conduct might be submitted. On the committee are R. M. Alvord, vice-president, General Electric Co., San Francisco; Harry Harper, vice-president, Graybar Electric Co., Los Angeles; R. C. McFadden, sales manager, Southern California Edison Co., Los Angeles; and H. H. Courtright, president, Valley Electrical Supply Co., Fresno. Added to the panel were H. A. Lott, manager of operations, Southern California Edison; and F. R. George, manager of operations, Pacific Gas and Electric Co., San Francisco and O. R. Doerr general sales manager, PG and E., San Francisco, secretary of the committee.



Hartley and President Gates pictured at a recent regional PCEA meeting

Doerr presented a review of what is being done by various groups in business and government toward planning for postwar economy, some of the plans causing concern for the future of the enterprise system. The panel was then asked a number of questions from the floor relating to postwar aims. Among these Harper urged that immediate postwar production be directed to recreation of national wealth and not to comfort goods of a consumable nature. Lott expressed the opinion that many of the alternate methods and materials used in lieu of standard materials would become permanent.

"The Third Component," explained Hugo Bedau, vice-president, National Federation of Sales Executives, the concluding speaker, is that quality of sympathetic understanding, confidence, and faith that Dr. Loomis in his book declared essential between doctor and patient, and is just as essential between management and employees. He indicated how every type of business relation has behind it a human relation-

Alvord Lott McFadden Courtright Harper Fisher

ship. In the past, ignorance of that fact has permitted business management to lose its employees' and customers' faith and demagogues and radical labor leaders have captured it and turned it against business and the enterprise system. His talk will be published later.

Administrative

BLUE prints altered to today's entirely new set of specifications but retaining the essentials for efficient operation were carried out of the Administrative Service Section's informal working sessions. Chairman L. C. Rausch (Coast Co. G&E), assisted by F. C. McLaughlin (So. Calif. Ed.), vice-chairman, and group leaders, had planned a program entirely without frills but with plenty of opportunity for forthright evaluation of the various adjustments tried out since Dec. 7 by the companies represented.

Importance of keeping communication channels open between management, employees and customers was hammered home by speakers at the general session Friday morning and underlay much of the thinking in Thursday's group discussions.

Shorn of sentimentalism, good human relationships became just "good sense" as presented by R. G. Kenyon (So. Calif. Ed.) and A. G. Schermerhorn of San Francisco (personnel dept. Pacific Tel. & Tel.).

"Capitalize on the American trait of fairness," was Schermerhorn's advice. The public is critical if it doesn't understand, usually friendly if it does, he pointed out, and there is nothing to be gained by concealment. All the time and money required to teach contact employees to interpret company policies is worthwhile, he believes, and qualities which make for friendly, courteous dealings are natural to most people if not prevented by routine.

Dealing with the subject as it affects company and employee, Kenyon urged that the whole question be seen as a practical means of improving the company's efficiency. "If it's just a handout, better keep it," he warned, "the fellow worth having on the pay roll has self respect."

Honesty of intent, consistency, simplicity and saleability are the yardsticks for measuring a personnel program, Kenyon thinks. To the personnel man, his advice is: Don't be a tough egg today and a sissy tomorrow; don't make the program look hard just so the boss will know you are doing a good job, make it simple so that anybody can get the picture; take into consideration the inexactness of human nature—don't try

Rausch McLaughlin

to edict, don't try to lay it down in one-foot lots.

"Any number of employees are stewing over conditions in their jobs that aren't basic," Kenyon pointed out. "We have good top management, good rank and file; somewhere in the middle is the improper relationship," he asserted. The weakness, he believes, is lack of attention to teaching employees how to be good bosses. A capable employee moved up from the ranks without any training in supervision doesn't fall down on the job to all outward appearances, he stated. "He gets the work out; all that happens is that he makes the people under him unhappy and the relationship between employees and management begins to break down."

This tendency to shirk supervisory training, to pick a man with care then throw him on his own, is hard on the supervisor, too, Kenyon brought out. He needs a lift from above, he can't get it from the people under him, he stated.

Accounting

That a common procedure in connection with accounting practices discussed would make a fair beginning to the solution of present difficulties was the concensus of the accounting group, sponsored by McLaughlin, and it was pretty well agreed that it would pay to hold a series of special accounting meetings to work this out.

Charles Hall (San Diego G&E) led a round-table on billing federal and governmental agencies for construction work. Accounting for damage to company property by trucks, autos and planes was discussed under the leadership of C. N. Rudkin (So. Calif. Ed.). Other round-tables with their leaders were: Amortization of defense project expenditures through accelerated depreciation, R. F. Allen (PG and E); Accounting for Social Security Taxes, especially refund of California Unemployment Tax, McLaughlin; What we have learned about preservation of office equipment and economy in use of office supplies, J. S. Bordwell (Calif. Elec. Pwr.); Where do we get replacements for clerical employees going out of service? G. M. Henderson (Coast Co. G&E).

Credits and Collections

Methods of saving rubber, automotive equipment and manpower took the spotlight at the credits and collections session, which was under the leadership of J. A. Long (So. Calif. Ed.).

E. G. Lanning (So. Calif. Ed.) reviewed the experience of his company with postal card meter reading in the Lancaster territory, selected last February as a testing ground. There are approximately 5,800 meters in the district—an area about 85 mi. long and 70 mi. wide—and about 2,500 meters are being covered by postal card to save close to 1,300 mi. of rubber each month they are sent out, he reported. Cards were mailed to the agricultural customers in April, July and September; company employees took the readings the other months. In July 60% of the cards were returned and usable; estimated bills were sent to the other 40%. Larger returns are expected to result from improved methods.

Southern California Edison is experimenting also with about 400 meters serving week-end or vacation residences in the mountain area. As a result of the two tests, the company believes that the best procedure is to read the meters in January, April, July and October and to send cards or estimated bills the other eight months.

Regulation W restricting the free and easy credit customs of the past has been accepted favorably by the credit fraternity in general, Leon Heseman (Calif. Elec. Pwr.) pointed out and has assisted in controlling delinquencies and in keeping down repossession in installment buying.

By making collections in the city on foot, San Diego Gas & Electric Co. has reduced auto mileage for this work 78% since December, E. J. Wright reported. In the rural areas the company has written customers explaining the situation and asking their cooperation, he asserted. Increased use of the telephone; a policy of making one trip only after a written notice; required deposits totaling twice the average bill for chronic delinquents are other emergency measures instituted.

In discussing summer cottage service, W. J. Crabbe (PG and E) cited the Monterey peninsula, where 10% of the 9.300 domestic accounts are seasonal. In Carmel, which has the bulk of the transient service, a collectors troubles are multiplied by lack of house numbers, necessity to identify accounts by the nearest cross street and failure of

customers to state locations correctly. Orders issued in the Carmel office reached an all-time peak of 894 for the month of August, he stated, and for the year 1941, a total of 6,480 orders—2½ times the number of meters connected—was issued. Under present restricted service, orders are accepted in the area until 1 p. m. for turn-on the same day except on Saturday and a day prior to holidays, when the time is extended to 4:30 p. m.

Emphasizing the importance of credits and collections during and after the war, Louis Mudge, assistant professor of Commerce, Fresno State College, urged credit men to think now about drafting a national plan. The alternative may be to have a plan forced on business by Washington, a plan that might not be entirely acceptable, he warned. Mudge predicted an era of prosperity for a considerable period after the war and voiced the opinion that to replace all the things destroyed will test U. S. industry to a point never yet visioned. Credit men, he believes, should regulate consumer demand and built-up purchasing power by keeping installment buying under control.

Let the schools know the problems of business, he pleaded, so that instructors can help students to get the *right* information and thus be better equipped to do a good job for business.

Personnel

While every member company is feeling the current labor shortage, greatest turnover seems to be in localities having war industries, it was brought out in the personnel session conducted under R. J. Tilson (PG and E).

Women are being pressed into services hitherto restricted to men and one member of the group went so far as to suggest that, if necessary, they could do practically any job in the industry, including operation of substations and steam plants.

Policies regarding draft deferment requests for key employees varied, one organization having on file 1,100 requests, another reporting that it makes no appeals except on employee request. Although it was agreed that results varied with draft boards, personal contact in the form of giving board members a picture of the company's overall operations had been well received in some localities.

One man stated bluntly that the longer the industry thinks there is some cushion and is lulled thereby into a false sense of security, the tougher it is going to be in the end. Draft boards have just one problem—to fill quotas, he reminded the group.

Contraction of labor crews and necessary down grading of supervisory forces is making utilities face the loss of trained men in which thousands of dollars have been invested, it was pointed out. Some crews have been cut as much as 50%. One company is offering employees the choice of a cutback or lay off with the understanding that the job will be available when business picks up again. Questions of extending leaves beyond the military to merchant marine and other war services; seniority considerations and other complexities of the present are yet to be solved by most organizations.

Customer Relations

Cooperation of the industry with defense organizations gives an opportunity for educational work and can result in lasting good will was the conclusion of the customer relations group (A. D. Church, PG and E, sponsor) following an account by W. H. Park of Pacific Gas and Electric's program in the Berkeley-Oakland area.

Biesber Jones Churchill Brackett

Park reported that the company cut its telephone queries by about 75% with a 15-minute radio broadcast in which the public's most common questions regarding wartime procedure were answered. Along the same line, the company has prepared a record for broadcast at night urging householders to make sure that their shades are pulled in observance of the dimout regulations. Another cooperative step was the circulation in the east bay area of 20,000 copies of a pamphlet on the control of skyglow.

Along with the telephone company and water department, PG and E has cooperated in staged "incidents" by actually sending men and equipment to the simulated disaster. The presence of the equipment tends to increase public confidence in disaster preparations, Park explained.

All contact employees should be familiar with the provisions of P. 46 and able to explain to the inquiring customer's entire satisfaction why he cannot get increased service, or why he cannot get his old electric range hooked up in a new location not now wired for electric cooking, G. H. P. Dellman (San Diego G&E) told the group in discussing the effect of priorities on customer relations. The successful presentation of the case is one in which the customer is led to place the blame where it belongs—on the war—and not on the utility or on WPB, he pointed out. San Diego Gas & Electric has one man working on priorities alone and is giving the customer every assistance it can.

Proper telephone technique and proper scheduling of calls was seen as the answer to the service problem in a round-table led by F. U. Naylor (PG and E).

Tying in with the day's findings, M. W. Phillips (So. Calif. Ed.) led a discussion on methods of getting information to company personnel. Whether the schooling of new employees in company history and policy and "refresher" training for older employees be given through information bulletins or conferences, management should recognize its responsibility to keep its entire organization up to date, it was agreed.

Legal

S. W. Scarfe (G-E) was sponsor, Gail C. Larkin (So. Calif. Ed.) chairman of the legal group. Paul E. Sloane (PG and E) discussed the different types of franchises in California and pointed out the benefits that had been derived both on the part of communities served and utilities through revising and clearing up different types of franchises as a result of the changes brought about by virtue of bond mortgage requirements. Among the advantages to communities have been equalization of the returns to the various communities and rate reductions.

Bruce Renwick (So. Calif. Ed.) discussed recent changes in procedure for condemnation or requisition of land or property by the federal government. He reviewed the more recent cases and proposed legislation related to the problem and certain legal aspects, including distinctions between condemnation and requisition; requisite contents of a "declaration of taking" and the measure of damages to which a property owner is entitled.

Constitutionality and application of the Wage and Hour Act to the industry was reviewed by Anne McDonald (PG and E). She pointed out that because of the possibility of the court's placing a construction on the act different from the construction placed on it by the Wage & Hour Division, employers were forced to rely upon the later construction at their peril. In subsequent employee actions, the construction of the Wage & Hour Division would not be binding in the courts, she indicated, though it probably would be persuasive.

Purchasing and Stores

A program related to wartime complexities was prepared for the purchasing and stores group by William de Waard, sponsor, and group leaders. That all tools and equipment now in service must be made to give the maximum of service was pointed out by J. P. Schaefer (Coast Co. G&E). To that end, the group recommended that member companies should instigate an educational program for all operating employees in the use and care of tools.

Difficulties in disposal of obsolete and idle equipment to aid the war effort (including methods of abandonment and write-off, expense of getting items to market and reluctance of superintendents and foremen to release equipment which they might sometime need) are being overcome and many tons of scrap are being put into circulation by member companies, it was reported. Some companies are preparing detailed lists of available items and submitting them to management with recommendations for write-off and disposal. When such permission is secured the material is moved to points of disposal as back haul loads for empty trucks. Initiation by top executives is essential to best results in a scrap program, it was emphasized.

In discussing procurement of material and supplies under war conditions (E. F. Watkins, So. Calif. Ed., sponsor) and advisability of adopting a scheme of surplus material information and exchange among PCEA members (H. H. Scoville, PG and E, sponsor) it was acknowledged that utilities are going to be compelled to "live off each other" to a certain degree. A suggested monthly list of available surplus items to be circulated among member companies within certain areas was discouraged, however, because of the expense and work involved. Such a list would be partially obsolete before it could be circulated, it was pointed out.

A lively discussion of Preference Rating Order P-46 as amended Oct. 10 took most of the afternoon and representatives agreed to meet for further discussion when each member had had an opportunity to study the provisions with his associates.

Prof. Walker Davidson

Business Development

USUALLY commercial men are the optimists of the industry. They can see opportunities when operating men cannot. They hold hopes even when the financial departments are certain there is nothing but debt ahead. At this conclave, while they were realistic as to the present, their instinctive hope kept breaking through the dark clouds to illumine a distant vista of when the war is over. It may have been mirage, but at least it was a goal, something to make the sacrifices and restraints of the present worth enduring and surmounting.

Both Frank C. Angle, imperturable chairman of the Business Development Section, (Allis-Chalmers) and Percy P. Pine, vice-chairman, reflected this underlying faith in the future. In starting the first general assembly with its agricultural discussion, sponsored by A. D. Bragg, (G-E) and presided over by A. M. Frost, (PG and E) Angle announced that its papers would be prepared in form to send to others interested but unable to be present because war responsibilities had kept them home on the job.

Blunt and fundamental was Frost's announcement of the theme of the agricultural discussion which he insisted the entire section stay through even if it ran overtime. There is no more important topic he insisted than, "are we going to eat next year?" His program of speakers made that question hit the stomach of every one present. The difficulties faced in providing food for our own nation as well as for the extended armed forces and by lend-lease to our allies, indicate that there will be less choice and far more restriction.

Agriculture Digs In

Dave Davidson, a Tulare county farmer, chairman of California's U. S. Dept. of Agriculture War Board, after emphasizing the urgent need to coordinate the food supply production to the specific needs of the war, asked the utility people, manufacturers' representatives, machinery dealers and other contacts with the farmers to aid in the conversion of crops from less essential varieties to those in great demand. Not only for food but to supply fibers and vegetable oils, much of the acreage now planted to luxury crops must be changed to others much more vital to the war effort.

Prof. H. B. Walker, of University of California, Davis, has never minced words in his discussion of the agricultural situation. His frank talk at the May conclave was followed at this

Wellhouse Pine Angle

meeting with a sequel which brought the problems of manpower and machine power into sharp focus again. In the foreground he set up the production requirements in fibers, fats and foods. Then he showed what had happened to the farm labor supply due to war industry drains, selective service, removal of the Japanese. Many crops too, he illustrated, have a higher labor demand under war conditions than normally. The need for dehydrated products is an example. Fresh apricots require 235 man-hours per acre; the same crop dried requires 433 man-hours. He was frank in saying that with an army of 7½ million, women would have to be put in fields. But that too requires adjustments and changes.

That California farms, so thoroughly mechanized, cannot be left to coast on their equipment and not provided with replacements Prof. Walker said was because the average age of California farm equipment is greater, for mechanization started many years before that in other regions. Threat of possible requisitioning of track-laying tractors would likewise hit California farmers more than any other state. Electrical equipment for farms too has been in use longer and the need is primarily for replacement. Transportation for California farms has primarily been on rubber tires for rail lines are inadequate to handle its perishable crops.

As remedies Prof. Walker suggested: 1. Farmers must make quick and radical changes in their production programs. 2. Some subsidies must be considered to cover production and harvesting risks on wanted essential crops. In some cases machinery and equipment would be a tremendous man-hour equivalent. 3. Labor must be done by whoever is available and women represent the best untapped source. 4. Production must be based on a labor-hour output rather than dollar cost. 5. The idea of land armies has merit; drafting may be necessary. 6. Cross haul of products must be overcome. 7. The gov-

ernment must recognize more fully that agriculture is a consumer of goods and services (many of which have been thoughtlessly ruled out for the duration) as well as a producer of raw products. The greatest waste of manpower, he concluded, was in the huge army employed by government to make rules and regulations.

Likening the gradual breakdown of electrical equipment to a creeping paralysis of which few were aware as opposed to the dramatic catastrophe of a bombing, J. P. Fairbank, extension specialist in agricultural engineering, University of California, talked of the USDA War Board program for maintenance of farm equipment. After stressing the importance of keeping equipment in operating condition he urged the cooperative assistance of farm organizations, utilities, manufacturers, dealers in farm equipment and educational institutions in the production and dissemination of publicity by means of press, mail, radio, posters and group meetings. Technical information on care and upkeep of electrical and farm equipment would be prepared by the engineers, then worked into advertisements and publicity by the advertising people of the industry.

By concrete examples E. G. Stahl, San Joaquin Power Division sales manager, PG and E, illustrated how utilization engineering for large agricultural customers has resulted in reduced energy cost to the customer yet better paying revenue to the utility. This paper will be published in full in a later issue. His contention was that the engineering of the customer's equipment was just as important to the utility as the engineering of the facilities to serve.

Industrial Prognostication

Future load plotting is no new thing to the electrical industry. Indeed to such future planning can be attributed its preparedness for the unprecedented loads thrown upon utility lines by the war program and the ability to "take it." But to plot load curves ahead in war time, especially this unpredictable war, is speculative. It was interesting therefore to find, in the industrial session, Thursday afternoon, that independently nearly all companies represented envisioned very similar load curve behavior should the war end late in 1943.

Purpose of the study, R. C. McFadden (So. Cal. Ed.), sponsor of the discussion indicated, was to seek ways to re-employ the war production electrical capacity in peacetime, and cushion, if possible, the shock to the utility electrical systems of sudden amputation of load. In this study the opinions and

Stahl

predictions of members of the industry —manufacturers and distributors—was sought. A. L. Laws (So. Calif. Ed.), then presided over the session and asked to have presented in turn for separate consideration what might be expected from the aircraft industry, by P. P. Pine (San Diego G&E), Ordnance manufacturing (prepared by F. T. Schell, So. Calif. Ed., but presented by Laws himself), shipbuilding (prepared by J. H. Gumz and E. E. Peterson, PG and E, and presented by A. M. Frost), army camps by Roy H. Misenhimer (Calif. Elec. Pwr.), and domestic by Milo Cain (Coast Co. G&E).

Aircraft building, it was generally felt, would continue after war ceased, though on single shift operation. Allan Bronold (Westinghouse), called attention to the large air force and the probability that all of it would want to fly in civilian life after the war. He also felt that restoration of street lighting, remodeling and relighting of stores and commercial establishments now curtailed in their use of light, and a continued industrialization of the West would absorb the loads lost to war production. Light metals, produced in abundance in Western war factories will play a big part in future economy, E. G. Stahl felt.

Ordnance production, Laws explained, was usually done in converted manufacturing plants which after the war would return to making the civilian goods formerly made. Help to such industries to convert back again was declared to be an opportunity that utilities and electrical manufacturers must not miss. Frank Angle pointed to the heavy tool equipment installed in Western plants for war production and predicted that since such things as heavy casting were handled only in the East before, such could now be done here.

Of shipbuilding there was similar optimism expressed. Prefabrication of hulls and sections, welding, and production of ship plate from Western steel mills now being erected would put coastal yards in a favorable competitive position with eastern yards for shipbuilding in the future. Walter Scott (G-E) spoke of industrialization of the Orient and the building of a two-ocean navy, the conversion of some of the Liberty ships to faster turbine drive and repair work on vessels as possible.

Of the future of military camps or of their load characteristics Misenhimer could talk little. Only the opinion was expressed that if the U. S. maintains a large standing army after war many of the present camps and airfields may be made permanent.

Domestic load was anticipated to increase immediately and in substantial degree after the war by Milo Cain and others who spoke on the subject. Release from dimout restrictions, return of domestic merchandise on the market, restoration of selling, all would be felt immediately. Commercial usage too, it was felt would increase and gold mining be started again. Discussion of the domestic load led to present day problems of keeping the existing appliances in repair. O. R. Doerr (PG and E), told of his company's philosophy in backing appliance repair service, training personnel, keeping its 800.000 domestic customers conscious of their appliances and maintenance.

Stahl was of the opinion that the same engineering study applied by his department to agricultural power customers' equipment, turned upon better engineering of industrial customers' utilization equipment would result in improved power factor and load factor and hence revenue. P. M. Downing (PG and E), was more optimistic that power load would not drop off as fast as conjectured by those making the charts. Further he reminded the group that during the war the utilities will not be able to increase their generating facilities as they normally do and the surplus of capacity at the end of the war will be a cushion until they can begin to build generating plant again.

Lighting, Wiring, Dealers

Submerged by the war has been the commercial fostering of lighting, wiring and merchandise. These submerged interests of the industry rallied for a last stand, at least, at the Friday morning session, presided over by P. P. Pine.

Fred J. Wellhouse, sponsor of the lighting discussion had just been elected regional vice-president of the Illuminating Engineering Society and had been lately devoting much time to assist voluntarily at the regional headquarters of the Office of Civilian Defense. Hence his discussion of the military restrictions on lighting in the Pacific Coast area was authoritative. Much of that discussion was of a military nature and

Rice and art

dealt with the further restrictions called for in Proclamation 12. Some discussion was also indulged in over the economic consequences to the utilities of the dimout.

A second part of the lighting session dealt with trends and developments in lighting practice during the war that may affect future patterns. Sam Hazleton, Jr. (G-E Dept., Oakland), introduced a General Electric sound movie showing how light can help win the war, by differentiating between lighting for defensive warfare (blackout and dimout) and for offensive warfare (to increase production by improving speed of seeing).

In subsequent discussion it was brought out by Frank Anderson (Westinghouse Lamp, Los Angeles), that fluorescent lighting for the home had been stopped by the war on the eve of great expansion, that simplification of lamp types would affect future trends, that use of color in fluorescent lamps for window effects was being developed in wartime, that mercury high intensity lighting in factories was proving economies that would stimulate industrial lighting, and that plastics and metal substitutes would find a new place.

That the experience with redirection of light from street ornamental standards to comply with dimouts had revealed the great inefficiency of street lighting equipment and that postwar street lighting would be better designed was the observation of H. W. Turner (So. Calif. Ed.).

Wiring may be under wraps for the duration, but the code and ordinance committee of PCEA is not to relax its efforts to secure adoption of the uniform code, E. F. Watkins (So. Calif. Ed.), sponsor of the wiring discussion, announced as he read a resolution passed by the board of directors. Arthur Kempston talked of the "indifferent" cities and the resistance to change to the new code, listing however the advantages to the inspector in having a legal code based on the National Electrical Code and Underwriter's Laboratories standards. He also explained how the uniform code takes into account the Safety Orders of the state Industrial Accident Commission. Watkins ended the session with a plea to all those in the association to support and aid the efforts of the ordinance committee in getting the uniform code adopted more universally.

Henry C. Rice (So. Calif. Ed. merchandising manager), brought scenery and an hour glass to illustrate by analogy the choking effect of inadequate wiring in the distribution of the products of the manufacturer of appliances and devices to the market "across the bridge." He advocated as steps that can be taken even now, 1. adoption of the uniform code in all communities so that all the wiring methods listed in the code would be made available after the war is over, and 2. putting of advertising money into preparation of the public mind to rewire their homes in the future rather than use it to boast of receiving the Army and Navy E.

Cut down in time, even as merchandise itself is curtailed, the session winding up the section meetings devoted to "Maintaining the Dealer" was brief but ardent. J. Clark Chamberlain, secretary-manager Bureau of Radio and Electrical Appliances, San Diego, made an eloquent appeal for the immediate attention of the industry to ways and helps to keep the dealer in business, especially the business of servicing appliances. Loss of key service personnel, lack of parts and the closing of many businesses would drop the entire problem in the lap of utilities, he predicted, if such dealers were not kept alive. Various aspects discussed were those of informing consumers on the care of their equipment, training classes for new service personnel, and a suggestion by Stahl that efforts be made in concert to get WPB recognition of the need to keep home front essential appliances in repair and to provide materials and parts therefor.

Hunt Baugh

Operating Economics

TURNOVER in manpower with the attendant problem of training new recruits quickly in technical and complicated jobs, together with wartime maintenance difficulties brought about by material shortages and substitutions featured the deliberations of the Operating Economics Section. H. A. Lott (So. Calif. Ed.) and L. J. Moore (PG and E) with the help of the section guidance committee and a competent corps of discussion leaders, put together a timely program geared closely to wartime operating conditions.

Integrated operation of interconnected systems over large areas and the specialized electric power and steam requirements of synthetic rubber manufacture with particular reference to developments in southern California were the highlights of the one general session of the section. Donald R. Jenkins, Westinghouse steam engineering specialist, outlined the American rubber situation, reviewed synthetic rubber progress and discussed plants and processes in terms of energy requirements. Jenkins' paper with the accompanying interesting and informative charts and diagrams will be published in a future issue.

Northern and central California's integrated systems carried a peak load of 1,350,000 kw. in 1942 and stand ready to supply power for a 1943 anticipated peak of 1,600,000 kw. according to I. W. Collins (PG and E). As contrasted with operating arrangements in other areas, this system meets demands from outside its area with no more formality than exchange of letters or phone call instead of legal conferences. This is probably due to the 24-year integrated operation of the systems, he said.

In southern California a Power Interchange Committee supervises integrated operation of private, municipal and governmental systems so as to meet war demands, using the cheapest source of energy first irrespective of ownership. The successful operation of this committee was described by N. B. Hinson (So. Calif. Ed.). Two wartime loads in that area have power requirements in excess of those of the combined demands of all domestic customers in the 11 Western states, he said. Energy transfers designed to save fuel have been made over as many as four different systems. One recent successful cooperative interchange set-up involved the USBR, the Metropolitan Water District, the Defense Plant Corp., the Los Angeles Bureau of Power & Light and the Southern California Edison Co.

Lott Moore

Joint Safety Meetings

In place of individual accident prevention group discussions, E. C. Hunt (PG and E) arranged joint safety meetings with all of the various discussion groups in which impaired human efficiency due to changes in manpower, lower morale, priorities, dimouts, blackouts, and other wartime restrictions and regulations were discussed. The draft, enlistments, competition from high-paid war industries and intra-company transfers have brought loss of trained men, the transfer of untrained people to new jobs and the introduction of women which have demanded new techniques in job training and job planning.

A possible palliative was presented by Aylwin Probert, in charge of the War Manpower Commission's Training within Industry program. This activity can be adapted to any phase of utility operation, he asserted, due to the flexibility of the basic 10-hour course in job instruction which has been worked out for supervisors and foremen. The MPC has facilities and personnel for providing this training. It is thoroughly practical and is presented by men from other industrial plants. Sole aim, he said, is to assure a quicker victory by getting more work, greater production and greater efficiency from men, machines and materials. Utah Power & Light Co. and Idaho Power Co. are successfully employing the TWI program in fitting new and untrained people into skilled and semi-skilled jobs.

Employee distraction and dissatisfaction was reported with consequent bad effects on morale due to the conflicting reports on the selective service manpower requirements, uncertainty as to occupational deferment, rumors, speculation on the future, slackening of work in certain departments, the necessity for substitute procedures and substitute materials, and the many limitations and restrictions on normal habits. Recommended remedies were closer contact with employees, the development of increased interest in the job at hand and a thorough explanation of the importance of the individual job to the war.

Dimouts and blackouts have increased accident frequency rates and A. A. Straub (So. Calif. Ed.) recited incidents occurring during blackouts in southern California. Most of the accidents involved falls, which revealed the presence of many obstructions around plants and grounds that could be removed or protected. It was emphasized that when maintenance work required the opening of pits, tunnels, or ditches, immediate notification should be given guards or other employees responsible for patrol.

Use of many articles now made from substitute materials, deferred maintenance due to lack of materials and the use of salvaged materials are creating new accident hazards according to E. C. Woodruff (PG and E). Salvaged wire, unless carefully inspected, is

Strong George

liable to break during stringing; new types of rope have different characteristics from the familiar manila rope and iron wire will not stand the tensions to which comparable copper is subjected. Closer supervision and a new type of instruction are required to prevent serious accidents.

Hydro Generation

Wartime maintenance programs and the inspection and maintenance of penstocks, tunnels and flow lines were the principal considerations before the hydro generation group sponsored by E. E. Crellin (PG and E). Discussion coupled with formal presentations by C. L. Westmann (So. Calif. Ed.), John Spaulding (PG and E) and T. C. Stavert (So. Calif. Ed.) brought forth ingenious and informative ideas.

Availability of substitute materials enabled one company to install bronze insert stationary runner seal rings in a hydro turbine. These were caulked with a soft copper ring. This latter was obtained by burning insulation from scrap conductor in a wood fire, thus annealing the wire. In another station cracked slate in a switchboard was replaced with steel panels without taking the board out of service.

Repairs to a water wheel shaft cut by the abrasive action of sand and the lignum vitae seal rings were effected by setting the shaft in its bearings on the power house floor and rotating it by means of a worm gear drive. The worn places were machined and stainless steel rings welded into the prepared grooves. This was then ground to a mirror finish.

In another plant a piece of old leather belting was placed behind the regular packing in order to keep a turbine in service until time for a scheduled overhaul. Rawhide packing is being used on several water wheels with good success. When properly installed this material becomes soft and pliable and is not affected by the abrasive action of sand in the water.

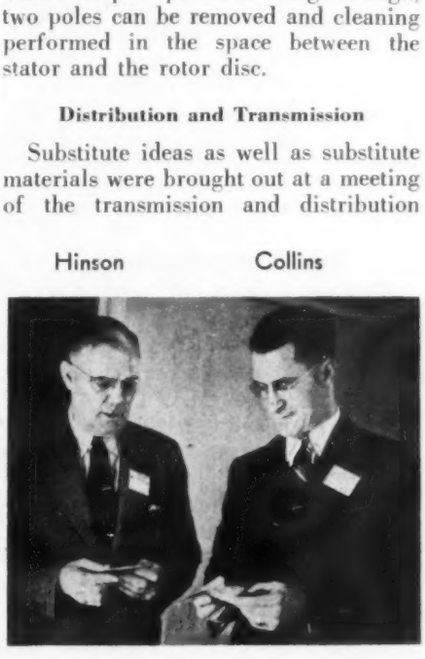
Substitute methods for cleaning algae from water flow lines in place of the customary blue stone treatment included the use of a contraption mounted on four rubber-tired wheelbarrow wheels. Brooms were mounted on the structure to clean the algae from the floor and sidewalls. The flow of water in the conduit moved the structure down stream. Capacity of the conduit was 165 c.f.s. Another method reported was the construction of a ball-shaped bale of oak branches which is slightly larger than the pipe. Water pressure will drive the ball through the pipe.

Discussion of programmed cleaning of hydro generators brought out that four to five-year intervals were deemed satisfactory for blowing out stator air ducts with compressed air. This is best done when the stator can be pulled, or where the pole pieces are large enough, two poles can be removed and cleaning performed in the space between the stator and the rotor disc.

Distribution and Transmission

Substitute ideas as well as substitute materials were brought out at a meeting of the transmission and distribution

Hinson Collins



group sponsored by C. E. Nevitt (San Diego G&E). H. H. Minor (PG and E) reported how short lengths of underground cable were being stripped, unstranded, welded and, in some cases, redrawn to produce supplies of No. 8 conductor. He reported that in some instances alternate or duplicate service lines were being taken off duty and turned to serving war loads.

C. T. Malloy (So. Calif. Ed.) reported that his company was having 4/0 conductor redrawn to 2/0 and No. 1 solid redrawn to make tie wires. He described a noteworthy job of salvage in which miscellaneous lots of cable were assembled into a 1,000-ft. length of 1,000,000 circ. mil conductor to permit emergency connection of Boulder generator A-2 to the transformers for the uncompleted A-5 unit. Fifteen silver solder splices were made and when generator phases were out of balance due to differences in the individual pieces of cable, reactance was provided by cutting up transformer iron and stacking it around the cables.

Old oval trolley wire can be annealed and used for ground wire according to E. M. Wright (PG and E). He urged more careful consideration of safety factors, pointing to unnecessary guying factors of 5 or even 10 to 1. He emphasized that any distribution or short transmission line can be operated up to the thermal limit of the conductors.

Conflict between the requirements of California G. O. 95 and the EEI-NEMA transformer standards as regards hangars is being met by modification of the standards according to C. E. Baugh (PG and E). He reported that a committee of California and Nevada utility men has requested a deviation from existing rules so as to permit hanging transformers with present hangars without conflicting with G. O. 95 as regards interference with the climbing space.

How a line erection crew of more than 100 men was built around only seven experienced men was reported by C. E. Wilson (PG and E). They built 60 miles of 70-kv. steel tower line.

Substations and Apparatus

Various methods of obtaining increased capacity from existing equipment were reviewed in the apparatus and substation discussions led by A. A. Straub (So. Calif. Ed.). Use of forced oil, forced air and water circulation for transformer heat transfer was considered in the light of material conservation. Transformer loading values using all of these systems were presented. Water spray for cooling was reported to depend principally on local conditions with respect to (1) securing adequate water supplies, or (2) disposing

Estcourt Hansen Philo

of water. Control of rust was reported to be a serious difficulty.

Personnel difficulties reviewed by Ray Edwards (San Diego G&E and D. D. Smalley (PG and E) indicated that the situation was rapidly approaching the point where utilities would be forced to accept any type of help that can be secured. Use of large newspaper advertisements, hitherto unheard of in the case of utilities, has been successful in recruiting personnel in some localities. Immediate recruiting and training of women for a variety of utility jobs before this source is exhausted by other industries was urged. Any racial restrictions heretofore tacitly enforced should be removed.

Benefits from standardization of distribution and power transformers are more tangible than ever before as a result of the war emergency according to J. C. Porter (G-E). Were it not for this standardization the industry would not obtain such advantages as greater speed of manufacture, savings of critical materials, lower costs, better performance and simplified purchasing. W. H. Schick (G-E) emphasized that in the face of war emergencies manufacturers cannot tie up engineering and production facilities to produce "specials."

Packaged equipment developed by the manufacturers and tested and accepted by the utilities is helping war industries meet their production schedules according to J. V. Kresser (Westinghouse). Particularly is forced cooling bringing huge savings in critical materials, he declared. E. W. Morris (Westinghouse) discussed 3-phase versus single-phase transformers and pointed out that 60% of present-day large power transformers are 3-phase units. Advantages responsible for this trend, he said, were ease of installation, better efficiency due to lower losses, savings in space, lighter weight and lower cost.

Steam Generation

Turnover of steam station personnel has reached unprecedented proportions according to findings reported at the steam generation meetings sponsored by Alf Hansen (G-E). F. G. Philo (So. Calif. Ed.) stated that training procedure formerly spread over two years had to be condensed into weeks. H. A. Noble (San Diego G&E) cited the effect on morale of recent conflicting statements with regard to draft possibilities. Many men quit and enlisted.

Included in blackout techniques cited by V. F. Estcourt (PG and E) in addition to ventilation was the provision in major steam stations of emergency transportation and living facilities for station personnel. There has been some security painting, especially of smokestacks, and oil tanks have been treated with infra-red camouflage paint.

Importance of all types of fuels in the war program has changed the attitude toward burning waste fuels according to E. G. Gothberg (PG and E). Lack of availability of natural gas to burn as standby fuel resulted in the development of a dual-type oil burner by F. G. Philo, which will enable boiler furnaces to go from low load to full load in a minimum of time. Hansen reported that bearing trouble in high speed turbines has been solved by reducing the length of bearings and designing the units to run at less than double critical speed. Maintenance discussions brought out that a substitute is needed for tin-base babbitt and that steel gaskets are being used successfully in place of monel metal on boiler hand holes.

The report on the Silver Gate Steam Plant presented by W. A. Zitlau (San Siego G&E) will be printed later.

Transportation

ODT restrictions as well as OCD regulations governing the use of motor vehicles during blackouts are matters of grave concern to utility transportation departments it was pointed out in the discussions arranged by S. B. Shaw (PG and E). New types of transportation ranging from bicycles to horses are being substituted for automobiles to conserve gasoline and tires. P. H. Ducker (So. Calif. Ed.), E. C. Wood and H. A. Filbert (PG and E) contributed to the discussions.

Meters

With the Army, Navy and war industries all seeking skilled instrument men, the turnover in manpower in utility meter departments is becoming increasingly serious according to those participating in the meter discussions sponsored by H. D. Noren (Coast Counties G&E). The possibility of employing women as meter testers and training them in the use of the photo-electric tester was explored and it appeared likely this would be done.

War emergency meter shop problems are becoming increasingly complex according to F. A. Redding (So. Calif.

Ed.) and T. C. Wren (Sierra Pacific Pwr.). Obsolete equipment is being repaired and restored to service, and hitherto discarded parts are being examined and reclaimed. This applies particularly to shafts and bearings. Manufacturers present expressed the belief that repair parts will continue to be available in quantities approximating those now being obtained.

Meter installation methods occasioned by war housing are a matter of serious concern according to William H. Talbott (San Diego G&E). In San Diego some 6,900 meters have been installed and 3,400 are yet to be set. An endeavor has been made to have all wiring conform to the utility's standard type "S" metering. Where such housing projects have primary metering, there is a possibility that if the houses are finally changed over to private residences with individual metering some costly changes in wiring will be required.

Meters being installed on wartime housing that will be dismantled after the war can be fitted into the regular meter retirement program.

IAEI Election

Inadvertently omitted from the report of the annual meeting of the Southwestern Section, International Assn. of Electrical Inspectors, last issue, was the account of the election of officers for the ensuing year, as well as two paragraphs touching upon the paper by Lee Adams, published in this issue in full, and a summary of items touched upon by Victor H. Tousley, IAEI secretary in discussing the interim amendments to the National Electrical Code. The election of officers paragraph omitted was as follows:

O. D. Butterfield, city inspector of Torrance, Calif., was elected president to succeed Clifford Prudhomme of Sacramento. First vice-president will be N. J. Siggins, San Francisco, second vice-president, Carl H. Herkelrath, San Bernardino. H. L. Gerber, chief inspector, San Francisco, was re-elected secretary-treasurer. Prudhomme succeeded W. J. Tretheway, Huntington Park, on the executive committee, with J. I. Dixon, Santa Clara, O. W. Newcomb, Long Beach and C. E. Heise, associate member, San Francisco. B. C. Hill, Oakland, was re-elected representative on the executive council, and R. H. Manahan as member and Ben C. Hill as alternate were re-elected representatives on the Electrical Committee.

● Electric Club of Washington recently re-elected its full roster of officers for the ensuing year, as follows: president, Harry Anger, Puget Sound Power & Light Co.; 1st vice-president, George M. Boyd, Westinghouse Electric & Mfg. Co.; 2nd vice-president, E. A. Will, of Allied Industries; C. W. Allison, treasurer, and secretary, Roger A. Walker —both the latter of Puget Sound Power & Light Co.

Women Electricians

How women are taking jobs as electricians (even to the extent of bending conduit and pulling wire as well as making telephone connections) in the Seattle area, was told to the Electric Maintenance Engineers Assn. of Northern California at a recent meeting by A. F. Cazin of Otis Elevator Co.

The meeting was devoted to an informal exchange of ideas and methods of handling maintenance in wartime. It was presided over by Jack Cochran of Pacific States Building & Loan Co., president of the group. A variety of ideas was presented to make materials last longer and give better service. The importance of giving new elevator operators a basic idea of what happens when they misuse the controls of their cars was brought forth by several speakers. The prevention of damage to elevator contacts and other equipment is more than worth the effort, it was developed.

More recently the association heard about "motor care and maintenance" from W. F. Snyder, district superintendent of service and erection for Allis-Chalmers Mfg. Co., San Francisco, at its Oct. 29 meeting. The moving picture *We Work for Victory and Plan for Peace* was also presented. J. C. Cochran, chairman, presided.

● Called "The Last Roundup—for the duration", San Francisco Electrical Contractors' Assn. and the Northern California Chapter, Southwestern Section, International Association of Electrical Inspectors, held an annual stag dinner at the Elks Club, San Francisco, Oct. 22. Real highlight of the occasion was the first appearance in public again of Ralph W. Wiley, chief of the department of electricity, San Francisco, following a serious illness. The occasion was handled by a joint committee of the two groups headed by Edward Dowd, Dowd Seid Electric Co., San Francisco, and with Harold Gerber, chief inspector, department of electricity, in charge of finances. About 200 attended.

R. J. Larrabee, new chairman of the Puget Sound Chapter IAEI was introduced at the September meeting of that group. Larrabee was elected by letter ballot to fill the unexpired term of the late E. G. S. Pryor. Quarterly meetings will be held henceforth, it was decided by the membership.

Meetings

Synthetic Rubber, a New Industry was the subject at the Oct. 20 meeting of the EMEA of Southern California. D. R. Jenkins, Westinghouse steam engineer, was the speaker. Walter P. Rittner has assumed the presidency of the group, succeeding Howard C. Park, who is now with Basic Magnesium, Inc. Walter A. Smoker has succeeded Rittner as vice-president. Other changes on the executive committee are appointment of Hayden G. Lane, General Petroleum Co., to fulfill the unexpired term of Park and Walter R. King, National Biscuit Co., to fill the unexpired term of Royal P. Yachik.

Illuminating Engineering Society, San Francisco Bay Cities Section, heard a report of the National IES convention at St. Louis from Fred Wellhouse, newly elected regional vice-president for the Western Region, and installed officers for the new fiscal year. Crawford Hill, Pacific Gas and Electric Co., also described the dimout methods to be applied by his company to ornamental street lighting. John S. Walsh, now in the Navy, formerly Pacific Gas and Electric Co., was installed as chairman succeeding Walter E. Carlson, General Electric Co., Lamp Dept., Oakland; Guy deLeuze, Panama Lamp Co. was installed as secretary succeeding Mathew J. Sisich, Pacific Electrical & Mechanical Co.

Electrical Contractors' Assn. of San Francisco and the San Francisco Bay Chapter of National Electrical Contractors' Assn. met jointly Oct. 15, San Francisco, to hear a report on the NECA convention at Bigwin, Canada, by J. M. Carlson, San Francisco association representative, and Clyde Chamblin, president of the Bay Chapter. Carlson gave a thorough report of the discussions in the various sessions, the election of representatives from Division 9, and concluded with colored moving pictures he had taken on the trip. George W. Abbett presided.

Electrical Club of Portland discussed the dimout Proclamation No. 12 at its Oct. 22 meeting. Walter E. Potter was chairman and had members of the Oregon State Lighting Committee, D. S. Campbell, Bonneville Power Administration; G. E. Bocarde, Pacific Power & Light Co.; T. W. Fitch, Portland General Electric; and M. S. Glenn, Northwestern Electric.

Oregon Chapter, Illuminating Engineering Society, inaugurated its new president, C. P. Merklin, at the first meeting of the fall season, Oct. 27. Ted Bakeman of Seattle, assistant director, Northwest Sector, 9th Civilian Defense region, brought official interpretations of dimout regulations under Proclamation No. 12. T. W. Fitch, retiring chairman, presided.

American Institute of Electrical Engineers, Seattle Section, heard a talk on mercury arc rectifiers by O. K. Marti, consulting engineer, rectifier division, Allis-Chalmers Mfg. Co., Milwaukee, at its Oct. 22 meeting. L. D. Snow, Puget Sound Power & Light Co., chairman, presided.

J. M. Zimmerman, staff supervisor of the manufacturing and repair department for Westinghouse Electric & Mfg. Co.'s Pacific district, spoke before the East Bay Electric Club on Oct. 26. His subject was *Our 1942 Contribution.*

San Francisco Electric Club heard about research in electronics engineering at its Oct. 19 meeting. O. K. Marti, Allis Chalmers engineer, was the speaker.

RMEL Sets Up Seven-Point Program

Postwar Planning Committee makes report at Denver conclave; Gaylord Buck named 1943 president

BUCK ALEXANDER

EXECUTIVES representing public utilities, manufacturers, distributors, contractors and dealers in Colorado, Wyoming, New Mexico and adjoining states assembled in Denver, Oct. 16 and 17 for the Rocky Mountain Electrical League's annual meeting, upsetting a lot of precedents, principal among which was election of a former president to lead the organization in 1943. Previous policy had been that, once a man had held this honor, it would not again be conferred. This time, members unanimously chose Gaylord B. Buck, vice-president and general manager of Public Service Co. of Colorado, as the individual to steer RMEL's craft next year, even though he had served as "skipper" in 1941.

No printed programs; no featured speakers; no social diversions; no time-killing contests marked the event. Round-table discussions and reports of committees were confined to carefully considered plans for the electrical industry's future welfare. Complete endorsement was given league policy in reorganizing its objectives to aid the national war effort by placing its personnel and other facilities at the government's disposal. Further endorsement was provided by a decision to hold more frequent conferences this winter, with a meeting of electric utility managers scheduled for January.

A seven-point program was enunciated by the postwar planning committee, of which A. L. Jones, commercial vice-president of General Electric Co., is chairman. It will (1) Study the effect of loss of war industry loads (2) Submit a program to take up the slack by promoting sales of appliances and the broader use of electricity (3) Provide the means to supply consumer goods for a public which probably will be *hungry* for new and better appliances, and will have the money to buy, through War Bonds and savings accounts (4) Consider the fact that all types of suppliers—automobiles, furniture, etc. also will be actively bidding for the purchaser's dollar (5) Suggest how utilities, dealers and others should prepare to offer stocks at the earliest possible moment after the termination of the war, in order to get in on the first rush of buying (6) Recommend that utilities survey their facilities to determine requirements for handling the postwar situation, in view of the fact that they have not been able to maintain and extend lines and appliances (7) Develop, through study by a subcommittee, a sane basis for financing installment buying, since government has tightened restrictions and the question arises as to whether some of these regulations should not be continued.

Jones' associates on the committee are: J. W. Alexander, Rawlins Electric Co., Rawlins, Wyo.; Ernest E. Brazier, regional manager, General Electric Supply Corp., Denver; Harry Adler, commercial manager, Arvada (Colo.) Electric Co.; and Arthur Prager, Albuquerque Gas & Electric Co. (N. M.).

Gaylord Buck's talk on *What Lies Ahead* at the opening session assumed the pattern of a "keynote" for electric utility conduct. He addressed the members bluntly, in words of one and two syllables, declaring he was quotable except for the profanity, which was picturesque and served to emphasize his credo: "There will be no 'good old days' so far as the electric utilities are concerned. A new era is here—now—and the future will more forcibly demonstrate its nature. The customer holds the whip, and I don't mean maybe. There was a time when, if the customer didn't understand the three-part rate, we put him down as a dumb cluck and let it go at that. It's our job to *make* him understand it, and we are the dumb clucks if we fail. That's only one of many things we must teach the customer. We must take him into our confidence. We must sell him service. We must deliver service whether we are equipped to do so or not. If we are confronted with a repair or service job that *can't* be done, due to limitations on material, equipment, man or machine power, bring it in anyhow—and get it done anyhow."

Buck's "Triple Triangle" program (which boils down to three angles: mechanical service; technical service, and customer service) dedicates the electrical industry to "the kind of business our sons will make of it. . . . We built this business (electricity) on a monopolistic basis, with little or no competition. It was developed on the idea that if a man was good at it, his eventual reward would be a private office and seclusion from the public. Do you think our sons are going to be satisfied to carry on in the same old rut? Don't you think your boy and mine, who can sit down behind the panelboard of a new-fangled bomber—and understand it—will want something more exciting than a conventional civilian career in the electrical business. He is used to improvements, change, thrills and adventure. The stage is set for him. We might as well get going, and accommodate ourselves to the conditions with which we are surrounded—or we won't have any business to hand down to the next generation; it will be taken away from us by the customers. We have the biggest selling job of our lives—making friends of the customers who are our masters in an individual as well as a collective sense."

The new officers, elected to serve with Buck are: vice-presidents: H. H. Lenhart, Cheyenne Light, Fuel and Power Co., Cheyenne, Wyoming; James E. Bullock, Western Colorado Power Co., Montrose, Colo.; E. A. Bradner, Las Vegas (New Mexico) Light and Power Co., and J. M. Depue, General Electric Supply Corp., Denver, Colo.; W. C. Sterne, Arvada Electric Co., Denver, was re-elected treasurer. George E. Lewis succeeded himself as secretary-manager of RMEL.

Present executive RMEL personnel, with J. W. Alexander, president, will continue in office until Jan. 1, 1943, when the fiscal year ends. Alexander's brilliant accomplishment in changing over the league from a sales and promotional organization to a smoothly-coordinated war agency was recognized by a set of resolutions and the gift of a desk set, suitably inscribed. He succeeded Buck to the presidency of RMEL in 1942, taking over (a few weeks after the Pearl Harbor episode) a league still attuned to prewar pursuits. He will hand it back to Buck completely overhauled for the war effort.

Electrical West

Business Guide

For Electrical Dealers and Salesmen

There's Light in the Old Game Yet!

Where are the pretty sales plans from the manufacturers that used to fill your mail box. Where are the salesmen who used to call? Where are the samples, the promotion materials, the deals? Where are the big sales meetings and showing with their prize contests and trips to the factory?

It's a lonely life, that of a dealer, these merchandiseless days. It's a helluva note when a dealer has to go out **looking** for lines and merchandise, but what was it Sherman said about war?

About the only one who calls around or takes much interest nowadays is the utility's dealer man. He is trying to be helpful but he is tied hand and foot with freezes, priorities and restrictions that are worse, if possible, than yours are.

Go to a convention seeking ideas to save your business and although there is plenty of discussion, no real ideas come forth. Mostly it comes under the head of "problems," but with this brand there are no answers in the back of the book.

There is talk of servicing existing appliances, but also of shortages of both parts and manpower and a ceiling on prices. Wherever there are training programs to lick these problems the outlook is better.

Much talk is about the wonderful market after the war, when a nation of people, hungry for a few luxuries and gadgets again will be eager to buy with their war savings. Their present appliances by then will be limping along or will have been consigned to scrap the Jap. But the war has to be won first, and a dealer can't wait that long without eating.

There are some fine nutrition programs, aiding the public to make better use of their appliances, but these too, while interesting and in a good cause, do not offer the dealer any specific way of earning a living by selling.

But there still is some lamp merchandise left to sell and this is the lighting season, with longer nights and cloudy days. There's light in this old game yet! At least for this one more season. So as a dealer you may as well go after this business. Herein is how—

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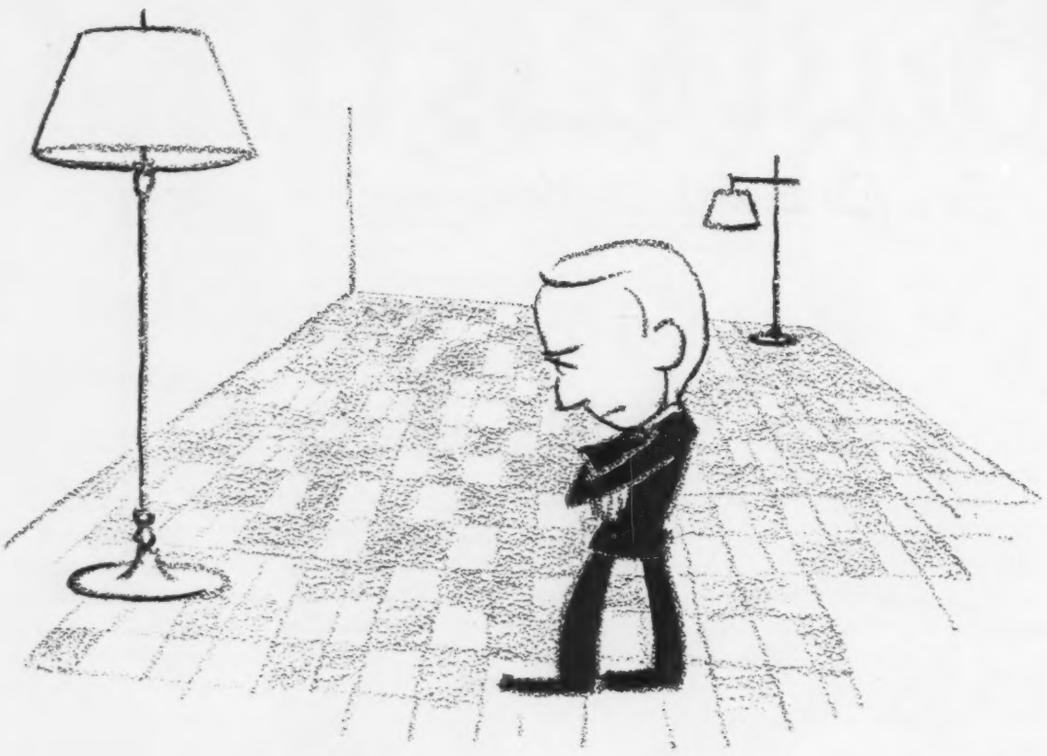
November, 1942



Can't see the forest for the trees?

Not any more. That may have been the case in the days when a big stock of floor lamps made your sales floor look like a forest. But the "forest" looks logged off or burned over these days by comparison.

Perhaps, however, you are one of the wise dealers who saw what was coming and stocked up early in the year on floor and table lamps pin-up types, adapters and decorative lamps, before manufacture stopped. Perhaps you have taken on a line or two fabricated from non-critical materials.

Lamp stocks generally are in better shape to start this lighting season of dark days and long nights than are stocks of Christmas merchandise. If you have any lamp stock at all, this is your time to sell it—for your own and for the public's good.

Since good salesmanship always seeks the customer's point of view, appraises his or her need, in order to satisfy it with the merchandise he has to offer, just what are the special and extra lighting needs of these war days?

Staying at home is being made fashionable. Everyone is doing it because of gasoline rationing and tire conservation. Staying at home makes it desirable to make that home more comfortable, especially as to seeing.

More night study and use of eyes, for with shortages of help more work is taken home to be done, more sewing, mending, ironing, done at home that formerly was done by someone outside the home. School programs have been intensified so there is more home work for the children too. All of this adds up to the much greater need for better light.

Dimout areas along the coast must be dark outside, but consequently it is more desirable than ever that in-

side of homes be more cheerful, brighter. Morale will be better if the dim outside is compensated for by brighter, happier interiors.

Shift work in war industries often throws the spare time of the worker into hours of darkness. For this reason the equivalent of daylight in home cheer and ease of seeing for reading and relaxation are necessary.

Such are the needs. You know the selling appeals, of course, or have you pushed them aside in the worries of the day? In many stores these days unfortunately the old spirit of service has been pretty badly bent, but why let it go down, even if selling isn't what it once was. There is still self respect to it and self respect demands treating customers courteously and giving as good service as it is possible to give in these times. By contrast, if you give good old fashioned courteous service and treatment you'll stand head and shoulders above the other stores in town whose service and courtesy level has slipped down.

When anyone stops to think of the good that is done by better lighting, there's real reward in that alone. Yet that good is the very essence of selling. There isn't anything tricky or fancy about it—just the sincere offering of benefit to be obtained by use of a good IES floor lamp or table lamp, and letting the desire for that very benefit sell itself.

Now, because the obvious is so often overlooked, a quick review or "brush-up" on these benefits of better lighting may be useful and inspiring. Apply these benefits to the offering of what IES lamps you have left to sell:

Save eyesight—it's the most precious of all the senses for 85% of our knowledge reaches us through sight. Any loss of eye efficiency necessitates expensive medical attention. Poor eyesight cuts down the ability to do things and enjoy life.

Speeds seeing—because the eye can take in the impression without reaching to get it, straining to see. Better lighting makes reading, sewing, handicraft work of any kind faster and more accurate.

Safer—because where there is good light throughout a room the chance of accidents is reduced. No half-seen or unseen objects lie in wait to be tripped over.

Brightens the home—adds cheer. Colors look true, decorations and details are seen at their best, people look healthier and happier, there are no harsh shadows to make people look old, tired, cross or wrinkled. Glare which causes frowns is not present in an evenly lighted room.

Healthier—for good lighting makes it natural for children to sit up straight, preserve good posture, instead of twisting around to see or to avoid glare. Eyestrain often leads to headaches and discomfort.

Better morale—is what it all adds up to. Despite restrictions and in some cases even danger the presence of cheerful light indoors keeps the spirits up.

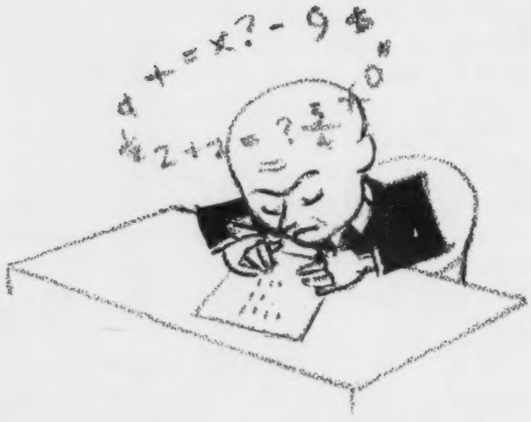
With such advantages pointed out to the public in advertisements, window cards and in sales talk, the stock of lamps should sell quickly and the benefits of good lighting be added to your war effort on the home front.

PUGET SOUND POWER & LIGHT CO.
PORTLAND GENERAL ELECTRIC CO.
CALIFORNIA OREGON POWER CO.
UTAH POWER & LIGHT CO.
IDAHO POWER CO.
ROCKY MOUNTAIN ELECTRICAL LEAGUE

Planned Expense Control Can Please People

Eleventh of a series of good sense articles on business management

By Ken Hampton



THE public likes to do business with a thrifty merchant just as people respect a thrifty individual. For this reason it is often an asset to a business to let its customers know that it is careful in controlling its expenses. Lavishness does not necessarily denote quality any more than poor surroundings denote lack of character.

To control expenses the manager must know what his expenses are, which means he must have a bookkeeping record that will keep him informed in detail on his expenditures. It is not the purpose of these articles to discuss ways and means of keeping record books but this observation is in order that: (1) like expenses should always find their way into the same account and be accumulated for periodic inspection and (2) enough separate accounts should be carried to enable the manager to get a clear appraisal of the scope and relative importance of each group of expenses.

It is a truism that business success ties more closely to proper control of expenses than it does to sales promotion. This puts a responsibility upon the merchant to give a liberal part of his time to studying and controlling his expense expenditure.

It is hard to do this because it is the nuisance part of the business. The glamor all lies around the sales, advertising and display work but holding down expenses is a chore job and the person who does it is usually thought to be a grouch.

To avoid this, the necessity for expense control should be taught to all members of the organization. Part of the training given a new employee should be to build on awareness of the cost of operating the business and the necessity for keeping it at a minimum. Expense control should be planned and taught to the whole organization just as salesmanship is taught. The necessity for not wasting anything, e.g. thriftiness, should be taught first, along with cleanliness. For these two must go hand in hand if business is to be gained.

Next the organization should be taught to plan its activities to keep expenses down. Such things as taking all deliveries going in one direction on one trip and keeping "will call" packages in alphabetical order to save time are simple examples of a little common sense. However, one need only casually observe the operations of a few stores to see how seldom such simple things are done. This serves to point to the fact that such activities must be planned and taught to the organization.

In controlling expenses, the savings should be made so that they inconvenience the customer as little as possible. For example, customers know that delivering merchandise is expensive and will gladly wait for deliveries to be made on regular routes, if such necessity is explained to them as being a means of helping the store save so that it can sell goods at a lower price.

Explaining to a customer the necessity for delay or inconvenience is part of the salesman's job. He should thoroughly understand the necessity for keeping expenses under control and be part of the planning and operating unit that makes that control effective.

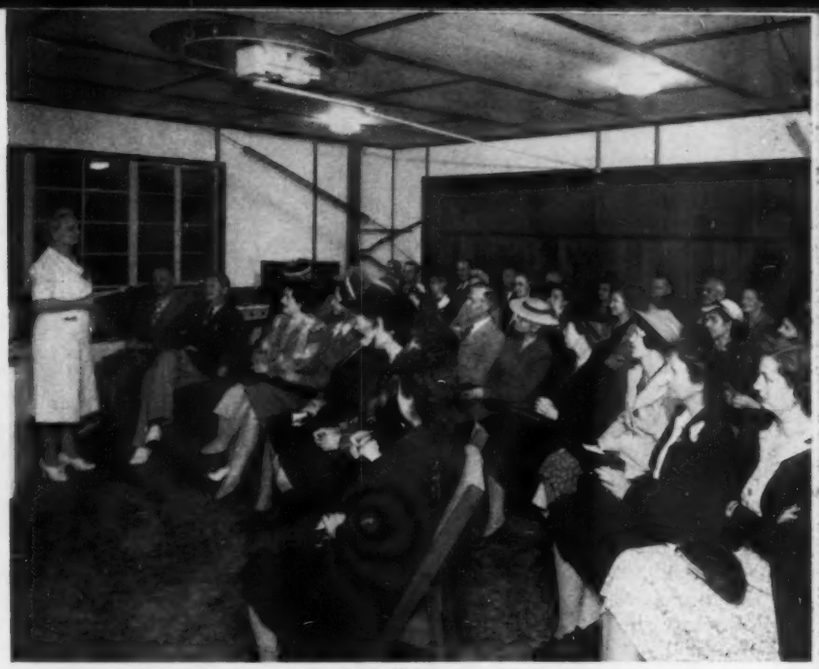
A definite part of any successful organization's time should be devoted to studying its expenses. This is a job for the managers and foremen as well as the office force which compiles the records.

The operation of the business should be continually reviewed from the expense as well as the sales viewpoint. In doing this it is well to look at the expense in groups. For instance all those having to do with sales and advertising may be considered in one group; those having to do with plant operation in another, overhead and management in another. Each individual account should be examined as well. By doing this and making comparisons with past records, the trends either toward too little expenditure or too much emphasis on one activity may be uncovered and corrected.

The purpose of business is to make a return on capital and effort for the owner in the form of a profit. Profit is only possible when expenses are less than income. The merchant must first keep records to tell him how well he is accomplishing this and secondly, use his records to help him and his organization plan and operate better. His success will be in almost direct ratio to the time and care he applies to this job.

Victorious Health

Meal planning courses given to war workers' wives in the West



Initial "Health for Victory" class for wives of employees of Bureau of Power & Light, Los Angeles, from which the program spread to other local industries, housing projects, department stores and public

AMERICANS used to take food for granted, there was so much of it. That was before America took on the job of feeding its allies, its big army spread over the world and its own populace too. Now with restrictions on sugar and coffee and more in sight, Americans are becoming conscious of food and diet in a way that is new to them. They are becoming interested in getting a balanced meal out of a restricted supply, of keeping healthy despite longer hours, night shift work, the strains of war.

"Health for Victory" clubs, an idea which came out of Westinghouse's own plants, have proved to be an answer to this public interest in food, as the program has spread throughout the West. Seven Western utilities have interested themselves in the program, set up clubs among the wives of their own employees and those of 18 war plants, for a total of 25 clubs as of Oct. 6, and the movement is just getting under way.

Utilities enlisted include Puget Sound Power & Light, Seattle City Light, Utah Power & Light, Idaho Power Co., Los Angeles Bureau of Power & Light, Pacific Gas and Electric, and Hawaiian Electric Co. Some of the industrial groups in which these utilities have started clubs include Morrison-Knudsen Co., Olsen Mfg. Co. and Sawtooth Mfg. Co., all of Boise, Idaho; Friden Calculating Machine Co., San Leandro; Norris Stamping & Mfg. Co., Los Angeles; Pacific Car & Foundry Co., Renton, Wash.; Thermador Electrical Mfg. Co., Los Angeles. Clubs have also been started in several war workers' housing centers, such as Yesler Terrace Housing Project in Seattle and Wyvernwood in Los Angeles.

Originated by Mrs. Julia Kiene, home economist for Westinghouse, when she became interested in reducing the lost time due to illness of that company's employees engaged in war production, the course in nutrition which she started for that company has been in demand first by other nearby industries, then utilities, and now, through them, is being spread to industry workers, women folk throughout the nation as a public spirited, non commercial war contribution. Now she prepares each month's lesson (there are 12 in the series, one a month), and Miss Betty Lake, home economist for the West, with headquarters at San Francisco, makes a tour by air to instruct the home economists of the utilities in the presentation of each lesson. There are charts, movies, demonstrations and the talk must be synchronized to the cooking of foods. For that reason a rigid training and rehearsal program is carried on.

Each new group starts with lessons 1 and 2, which are upon the basic food fundamentals. Then each month's new lesson is timed to the seasonability of foods, their availability and as closely as possible, their price, for meals suggested are based on a weekly food budget of $14 to $16. Monthly "Meal Planning Guides" are furnished each one attending. These keep them acquainted with any new restrictions, contain suggestions for daily menus for breakfast, lunch, supper and the lunch box, contain recipes and practical advice.

Monthly service and booklets are furnished the participating utilities and industrial plants at cost, said Charles Meier, merchandise manager, Westinghouse, San Francisco. "We insist that these clubs be absolutely non-commercial, and do not even ask that electric ranges be used in the demonstrations. We consider this a war effort and have nothing at all to sell in it but better health for our war workers and their families."

In Los Angeles the clubs are increasing in number fast, according to Arthur W. Elliott, Bureau of Power & Light. There are 13 clubs in operation and more are being started. The Bureau uses six different meeting locations, two of which are theaters.

In Salt Lake City the clubs are under the supervision of W. A. Huckins, sales manager Utah Power & Light and Miss Nancy Finch, home economist. In Idaho Power, Bob Hogg, Boise division sales manager, and the home service staff are carrying on the work. Pacific Gas and Electric Co., under Bert Reynolds, merchandise manager, has prepared a folder especially telling of the program and offering it to all the manufacturing

Mrs. Julia Kiene of Westinghouse, originator of the program, starts it with Nancy Finch and Utah Power & Light dealer sales promotion women, who in turn will carry program to wives of employees of the utility and of local industries of Utah

plants, shipyards, etc. in its territory.

For Westinghouse the program is supervised in the San Francisco district by A. B. Murphy, in Seattle by George Miles, Jr. in Los Angeles by Bert Kramer, and in the Mountain region by Mel Henoch.

Personnel 80%

San Diego dealers seek servicing solutions

No more cooperative nor aggressive and realistic group of dealers exists than those of San Diego. Perhaps it is due to the coordination successfully accomplished by the Bureau of Radio and Electrical Appliances.

When the board of directors of that organization met Oct. 2 to hear a report of their secretary-manager, J. Clark Chamberlain, it was to look facts in the face and decide a course of action for the next few months at least.

In San Diego the situation is aggravated to the farthest degree by the tremendous influx of war workers, the housing shortage, the intense demand for electrical appliances and lately by the pirating of service manpower by the War Manpower Board. New president, E. W. Kinmore of Chula Vista, Calif., presided. Discussion was lively and participated in by the entire group of directors.

The dealer situation was characterized as being one 80% of personnel and 20% parts. Merchandise itself is a purely mechanical function. No more electrical merchandise is being manufactured and only absorption of small pockets of stock from distant territories where demand may not exist offers any hope for the dealer. A number of manufacturers, distributors and dealers have obtained what stocks of other lines they can obtain to replace the electrical goods formerly carried.

However, the service problem is not so easily faced. There is a definite responsibility on the part of the industry to keep appliances in operation if possible. A dealer's interest is in his good name, if he has been in business for some time. The distributor's interest is his investment in the brands which he has carried and hopes to carry when it is over. The manufacturer's responsibility is to his brand. It was felt he must be kept aware by the dealer and the distributor of his need to supply repair parts. The utility faces the possibility that if dealers go out of business and service departments fold up, the entire service responsibility may be dropped in their laps.

With these factors to concern them, several of the steps being taken to alleviate the situation were discussed.

The utility has prepared a booklet especially applicable to its own territory and climate. It is a *Wartime Timely Guide to the Use, Care and Repair of Electric and Gas Home Appliances.* Its purpose is to obtain the cooperation of the public in the care of appliances to make them last, to make such minor repairs as cord changes themselves, to caution them to let a qualified service station do the real repair. The booklet also suggests bringing the appliance to the dealer wherever possible to conserve transportation.

Problem of distribution of such a booklet was thoroughly discussed. Several methods were suggested. Among these were a series of courses being held by the utility for the American Women's Volunteer Service, where copies can be distributed.

Other methods suggested were to mail them only in response to requests initiated by radio announcements and newspaper advertisements, distribution by block sector women's groups and possibly through the Boy Scouts. The suggestion was made that possibly Scouts could be interested in becoming their own block electric cord fixers as a means of doing their good deed and likewise aid their neighbors to make the best use possible of home equipment. The block plan has since been adopted and classes are being organized to acquaint sector women defense leaders of its value and use and to supervise the distribution.

Interesting sidelight was a report of a spot check made of 100 customers by E. W. Meise, San Diego Gas & Electric Co. Of these it was found that the majority of customers had appliances in rather good condition, that in general they were in daily or frequent use, that there were not enough surplus appliances to organize a swap program.

The replacement of trained service personnel, drawn off by the War Manpower Board into critical war industries nearby, is being attempted through a vocational school program for radio technicians and steps will be taken to train high school students for half day work and half day school. Cooperation with the local school authorities gives some promise to the latter program.

The board of directors decided that the critical nature of the situation made necessary the calling of the annual meeting of all dealers in the county with a program designed to acquaint them with the realities of the times.

● THE FIRST WEEK of February has been selected for the 1943 Western Spring Market at San Francisco according to Frank K. Runyan, vice-president of the Western Furniture Exchange and Merchandise Mart. Like the two previous wartime marts this one will include careful analyses of prevailing conditions by qualified speakers.

"Bomber Builders"

"Build a Bomber" is a slogan applied to a new lighting stimulation drive initiated by the General Electric Co. lamp department as a means of developing better lighting facilities for the thousands of small plants throughout the nation converting to do subcontracting on war production. The program is developed much in the manner of a commercial promotion.

Anyone in lighting activity (engineers, wartime lighting counsellors, lighting fixture men, lamp salesmen, jobber salesmen and electrical contractors) is eligible to enter the program. Those who sign up the pledge are given a silver bomber badge. When one who has signed has created the equivalent of 100,000 extra man-hours of production by improving lighting to increase production, on a basis established in the drive, he is given a gold bomber builder button.

Lighting installations dating back to Dec. 8 are counted. Improved lighting, however, is the only lighting that counts. New plant construction does not gain credit. Duplicate credit between one or more salesmen is eliminated by dividing the credit between them. Credit is based on the number of workers affected by the installation. Forms for reporting, display material, pledges, progress charts, are all provided by the lamp department.

● HEALTH ADVERTISING, stressing those qualities in an electric range and electric refrigerator which preserve the vital elements of food stuffs, have been appearing in large-size space in the Nevada papers on behalf of electrical dealers in the territory serviced by Sierra Pacific Power Co. Informative copy which tells of foods rich in vitamins and how they should be handled, of others containing needed calcium and similar subjects have been carried in a full series of connected advertisements. Stress is laid on the necessity to "save what you have" meaning both the appliances and the foods themselves.

● LISTENWALTER & GOUGH, electrical appliance distributors in Los Angeles, have added lines of paint and furniture to offset the discontinued appliance lines which they distributed in such quantity before the war. Largest distributor of Philco radios in the world, the company is taking on Philco's storage batteries. However, style furniture and paints have been added and many of the company's dealers are carrying these lines. To aid dealers in merchandising these new wares, advertising and sales help is provided by the staff of this electrical distributor.

Dealer and utility service men at American Fork, Utah. were given instructions by Westinghouse's M. S. Henoch, above, left, and also by R. W. Cass, of Hotpoint, above, right, to aid them to repair rather than replace parts

Make Them Last

Manufacturers tour Mountain Region with repair ideas

"Repair rather than replace" was the promotional theme under which several manufacturers conducted a series of meetings in the Intermountain territory to help dealers establish service departments. Classes were held by Westinghouse, General Electric Supply Co., and Hotpoint for dealers, service men, utility service departments and home service advisors. J. F. McAllister of Utah Power & Light Co. assisted in organizing the meetings.

Newly developed substitute materials were emphasized. Service men were urged to make full use of everything rather than junk parts which could formerly be replaced. Included were such items as heating elements and switches.

Westinghouse meetings were under the direction of J. A. Marine of the Salt Lake City office with talks by W. F. Schanz, Northwest district service superintendent, Seattle, and M. S. Henoch of San Francisco.

Hotpoint's meetings were conducted by R. W. Cass, Pacific Coast field representative. The General Electric meetings were held under the guidance of Dean Miller of the Salt Lake District office, assisted by Wm. Kearns, field representative of the company's service department at San Francisco.

S. D. Closes Store

Like many other utilities, San Diego Gas & Electric Co. closed up its merchandise store on the main floor of its Electric Bldg., San Diego, Oct. 3. "Because equipment and appliances that we sold are no longer being manufactured with the one exception of incandescent lamps, which can be purchased in other stores, this move was inevitable," said A. E. Holloway, vice-president in charge of sales. The company closed its store in order to make available to dealers the remaining stock of appliances.

Earl Warren, store manager, was established at a desk on the main floor to take care of orders for repair work on merchandise that had been sold by the company only. Repairs on other merchandise sold by dealers was referred to those dealers.

Stores in Oceanside, Escondido, Coronado, La Jolla, La Mesa, and Chula Vista were still selling off the remaining merchandise but it was expected all these would close by the end of the year. E. W. Meise, merchandise superintendent, is devoting his efforts to dealer assistance and promotion.

Letters from Home

C. A. Duncan, proprietor of the Duncan Electrical shop, 115 Howard St., Spokane, has a good idea which might offer a suggestion to other stores and shops which have representatives in the armed forces.

Three men from Duncan's staff are in the army and frequently customers and friends inquired about them and asked that a message be sent to them. Accordingly Duncan had sheets prepared, headed, "Messages to Bob", or whatever the name might be—a pad for each boy.

When customers or friends make an inquiry they are handed the pad and asked, in fact urged, to write at least a few words and sign the sheet. Duncan forwards the sheets to his former employees.

"It is simple, informal and inexpensive," said Duncan, "many will not take time to write a letter, but will jot down a hello and we feel that such community letters keeping men in touch with their former business associates may easily be morale builders. It is a contribution stores all over the nation might make with small effort."

Hotpointed to Future

Buy War Bonds Today-Electric Kitchens Tomorrow is the theme of Hotpoint's recently launched wartime advertising campaign. Twin objectives of the promotion are to cooperate in the sale of bonds and to keep the Hotpoint name before the public during the time that there are no appliances to sell. Supplementing a series of four-color, full page advertisements in national magazines, the company will supply mailing pieces, illustrations and copy for use by dealers and utilities, and mailing pieces reproducing the magazine advertisements.

Ads urging the earmarking of savings now for electric appliances after the war are pointed to the fact that even low-cost homes can afford all-electric kitchens.

In conjunction with the program, Hotpoint is distributing to dealers and utilities a "Home Planning File" for presentation to prospective home builders. The binder board cabinet, in the form of a red brick house, contains letter files in which the home planner may keep data culled from various sources on equipment, decorating, landscaping, etc. In addition, under the heading, "Saving Today to Build Tomorrow" is a file for keeping War Stamp books and bonds or a record of bonds purchased.

● "LUCKY ME! I'M AN AMERICAN!" is the theme selected carefully by the Modern Kitchen Bureau for an advertising theme "that anticipates the future and provides for the present." The bureau also offers a new publication, *The MKB Communique* which carries information regarding its advertising material available to utilities and dealers. This booklet is stimulating and serves as an exchange of ideas for display and promotion of nutrition clinics, service and maintenance information and other wartime techniques.

Make Copper Work Harder

Select motors for maximum load, wiring distribution for maximum use, make controllers take more

*By Lee F. Adams**
General Electric Co., Schenectady, N.Y.

MOST critical material essential in the generation, distribution and use of electricity is copper. Efforts have been made to increase the output of copper but the demand far exceeds the supply and there is no relief in sight. All copper is allocated and the electrical industry will get only enough copper for those things which are necessary to the winning of the war.

The first action was to substitute some other less critical material for copper. Except in a few cases, it is impossible to use any other metal for the electrical conductor. Where investigation indicated that steel, usually treated against corrosion, or other metals could be used with reasonable or equal safety and life expectancy, the Underwriter's Laboratories, Inc. or the Electrical Committee has authorized the use of such materials. It should be evident that this approach to the problem could result in only a very, very small saving of copper.

Another step taken to save copper was to curtail production and, in some cases, to stop entirely the manufacture of the product. The production of most domestic electrical appliances has been discontinued or limited to the requirements judged to be necessary for the needs of the armed forces, or for projects related to the war effort. In a few cases the product now made is of simpler design, using less copper and other critical material. For instance, a recent order prohibits the production of domestic watthour meters after Sept. 26 because it was determined that available stocks are sufficient to meet all essential requirements, thus releasing annually about 750,000 lb. of copper for military purposes at the current rate of production.

Load Equipment to Limit

The amount of copper saved by the two foregoing methods, namely, substitution of other materials and curtailment or elimination of production, was deemed to fall short of the saving required from the electrical industry. A study made by the manufacturers of different products indicates that further savings are possible by using the electrical equipment to better advantage, and thus reduce the demand for additional equipment, and thereby save the copper required to manufacture it.

In general this means eliminating some of the extra capacity that has been available but not used. It is estimated that the average general-purpose motor is loaded between 85 to 90% of its rating, whereas the manufacturer has indicated that such motors could be loaded to 115% of the rating. Similar underloading exists in other equipment and, while this may have been a satisfactory and acceptable method to employ in the past, the time has come when we must not only load to the name-plate rating, but beyond this rating.

How far to go depends on many things and no general rule can be stated. We must accept overloading to the point that will not cause failure within the wartime need. To arrive at the proper loading or overloading, it is necessary to have all the information available so as to arrive at the best possible decision, for any overloading will, in general, result in shortening the life of the equipment.

But this is war! What was right in peacetime may not be best for us now, and users should be willing to accept a shorter life so that the excess copper may be used for other war purposes.

In some cases the manufacturers have given indications of the amount of overloading which, in their opinion, may be used without decreasing the life of the equipment unduly.

Transformer manufacturers have advised that the output of an oil-immersed, self-cooled transformer may be increased as much as 33-1/3% by the addition of blower equipment, or up to 60% by the addition of water spray, and up to 66-2/3% by the addition of forced-oil circulation. To make use of such increased loadings no Code changes are necessary except possibly the requirement for the size of the fuse, but each case must be investigated because bushings, terminals, and leads may be a limiting factor, rather than thermal consideration.

Similar treatment may be extended to feeder voltage regulators. The use of voltage regulators may often conserve copper in the line and it has been found that, by improving voltage conditions on overloaded lines by the use of regulators, larger distribution lines are not necessary.

Increasing the capacity of transformers might require a change in the switchgear but artificial cooling is now in use in transformer vaults and other places, and considerable increase in capacity is possible by this means.

In the field of copper conductors, you are familiar with the change in the Code which permits the use of the 1937 ampere ratings under certain conditions. It is possible other increases in the ampere ratings of various types of wires will be permitted.

Not the Heat but the Humidity

The motor manufacturers have pointed out that electric motors do not break down because of overheating resulting from reasonable overloading but rather because of mechanical failure, and therefore maximum conservation of copper may be attained by operating the motors at their maximum capacity, disregarding overload factors which normally would be taken into consideration. The program has been outlined in a release from WPB that:

1. In applying motors, determine with maximum possible accuracy the horsepower required. This should be preferably obtained by test or, in the event that this is impossible, by accurate calculation, or by careful comparison with known power requirements of similar apparatus.

2. When applying open-type, a-c continuous rated 40C motors where the motor rated voltage is maintained and where the ambient temperature is usually substantially below 40° and will only occasionally or for short periods equal or slightly exceed 40C, select the standard horsepower rating which is at least 80% of the horsepower determined in accordance with recommendation No. 1.

[Example: The required horsepower, as determined in paragraph 1, is 9.3 hp; 80% of 9.3 equals 7.44; so select a standard 7.5 hp motor.]

3. When applying a motor a-c or d-c rated on a 50C or 55C basis, where the motor rated voltage is maintained and where the ambient temperature is usually substantially below 40C, and will only occasionally or for short periods equal or slightly exceed 40C, select the standard horsepower rating which is at least 91% of the horsepower determined in accordance with recommendation No. 1.

4. After selecting a motor in accordance with recommendations 2 and 3, torque and operating speed should be checked to assure their adequacy.

5. When applying an open-type, continuous rated 40C, d-c motor, in a location where the ambient temperature is usually substantially below 40C and will only occasionally or for short periods equal or slightly exceed 40C, select the standard horsepower rating which is at least 87% of the horsepower determined in accordance with recommendation No. 1.

It is recognized that in applying motors in accordance with recommendations 2 and 3 above, where the ambient temperature approaches 40C during a high percentage of the time and where the actual horsepower demand is such that it utilizes nearly the entire percentage allowed in excess of the stan-

* Presented at both the Northwestern and Southwestern Sections, International Assn. of Electrical Inspectors, at Portland and Fresno, respectively, in September, 1942.

dard motor rating, that in such cases a 50% reduction in motor life may be experienced. The immediate demand for conservation of material warrants this sacrifice in the relatively few extreme cases.

The more conservative limitation is recommended in the case of d-c motors in order to insure reasonably satisfactory life in those cases where commutation rather than temperature will be the determining factor.

The foregoing, stated in another way, means that 40° open a-c motors may be loaded to 125% of name-plate rating; and the 50° and 55° a-c or d-c motors to 110% of name-plate rating.

Controllers Too

The industrial control manufacturers have stated that any controller may be applied to a general-purpose motor having a horsepower rating on its name-plate which is equal to or less than the maximum horsepower rating of the controller, when the load to which the motor is applied does not exceed the foregoing percentages.

When controllers are overloaded as indicated above, it should be recognized that increased operating temperatures, some increase in maintenance of contact tips, shunts, etc. and some decrease in expected life of the apparatus over that obtained, when applied on the standard basis, will result.

Under these conditions the overload heaters will not be changed except for the 40° open a-c motors which are permitted to be loaded 125% of their name-plate rating. In this case the overload heater shall be increased and shall be 110% of the present size. With such overloading the stalled rotor and single phase protection provided under normal ratings will not necessarily be obtained.

The manufacturers of domestic automatic controls, small air circuit breakers, panelboards, distribution switchboards and enclosed switches have recommended that these devices be used without any change when they are used at the overload ratings permitted for motors.

In the case of welding machines, the manufacturers advise that these machines are rated on the basis of continuous resistance load for a given time period and that they are capable of delivering 25% above their standard rating on continuous manual welding duty.

As to Code changes for taking care of those applications, none appear to be needed except possibly in the case of the increased rating of the overload heater for the 40° open a-c motors which was increased to 110% of the present size. In no case does the recommended loading exceed 125%. The conductor size is now selected on the basis of 125% of the name-plate rating and this should be large enough.

Distribution Copper Savings

Many other recommendations for the conservation of copper have been made. For example, the distribution cutout manufacturers advocate decreasing the length of the flexible copper cable of standard universal fuse links by 6 inches, thus saving several thousand pounds of copper per year—small, but every bit helps.

Other suggestions are, to use motors of the highest speeds possible, and open motors rather than enclosed mo-

Reduce Copper in Distribution by Applying These Principles

1. Intelligently determine the amount of power required, and provide only for what will be really needed. Don't add up all the motor ratings to get the total load, as this approach will indicate an excessive power demand. Don't reason that the easy and safe thing to do is to provide too much capacity. Too much will now bring criticism just as quickly as too little.

2. Reduce the distance over which the electric power has to be carried to the practical minimum.

3. Transmit the power over any given distance at the highest practicable voltage.

4. Terminate the major transmission of the power at this higher voltage as close to the utilization point as possible, so that the distribution at the lower use voltages may be short. This result will be facilitated by the use of many small stepdown points rather than few large ones.

5. Choose the induction motor ratings with care. An oversize motor requires more critical material:
   (a) in the motor;
   (b) in the additional power factor corrective devices; and
   (c) in the conductors to carry the additional excitation kva to the motor.

6. Correct the power factor. Electrical loads generally require both kilowatts and excitation kva. The kilowatts have to come from the generating source and require the necessary copper for their transportation. The excitation kva does not have to come all the way from the power source, as it can be obtained from any power factor correcting device. Thus, by fully correcting the power factor as near to the load as possible the extra copper required to carry the excitation kva is eliminated and for the greatest distance. In addition, it is often true that generating equipment can deliver more real power (kilowatts) if the added requirement of simultaneously producing excitation kva is eliminated by power correction elsewhere.

7. Simple rugged power supply arrangements are what is needed. Excessive duplication of equipment or power supply sources is not now advisable.

8. Compact standard equipments save time, money and materials, as compared with older types of field assembled units.

9. Use modern equipment. Modern equipment, using special conducting metals, such as silver, on current carrying contacts and joints will permit operating the conducting copper at higher temperatures and therefore with less copper per ampere of current carrying capacity, due to resultant elimination of high resistance copper oxide, which tends to result in cumulative heating at those locations.

10. Proper layouts can limit the breaker interrupting requirements to optimum values and save copper in buses and breakers.

11. Eliminate spare transformers as far as possible.

12. The use of standard rated transformers will greatly facilitate the prompt delivery of a transformer should any emergency arise.

13. Use 3-phase transformers wherever possible, as they reduce the requirements for critical materials per unit of output.

14. Insofar as permissible select the type of insulation for your cables which will require the minimum of copper to carry the given load.

15. Limit the number of cables per duct bank. The current carrying capacity per cable is approximately 15% less for six cables, and 30% less for twelve cables in a duct than for three in a duct bank.

16. Finally, adequately maintain the equipment. It will deliver more output if kept in condition than if neglected.

tors where operating conditions permit. This usually would save one or two frame sizes and therefore some copper. Similarly, use a single speed motor or a single winding multispeed motor instead of two winding multispeed motors. Also, for new plants or extensions the utilization voltage should be restricted to 440 volt a-c, except where motors 100 hp. and larger are used, in which case the voltage may be 2,200 volts.

This latter suggestion opens up a very important source for saving copper because of the prevalent use of obsolete distribution practices, bad layout of the distribution systems and inaccurate knowledge of the loadings intended or expected. Tons and tons of copper are being wasted in this way.

Modern distribution systems have been described in various technical magazines and have been the subject of discussion before the American Institute of Electrical Engineers. Advertisements of manufacturers have explained them and indicated the saving in copper that can be made. The distinguishing features of the load-center distribution systems, as the modern system is called, compared with the old style distribution system, are:

(1) Power is taken directly into the building at primary distribution voltage usually ranging from 2,400 to 15,000 volts, and,

(2) Several small substations are used instead of one large substation for reducing the primary voltage to utilization voltage (usually 440 volts). These substations are located in the working area of the factory.

There are several circuit arrangements of primary and secondary connections which can be used and the application conditions attending each plant determine which circuit arrangement is to be used.

Most of the public utility distribution systems supply 11,000 to 13,800 volts. To get the most economy in copper such high voltage must be run to the load center substations in the factory, which is a violation of Section 7112 of the Code, as this section prohibits the use of voltages higher than 7,500 volts. This limitation should be removed.

There is also a violation of Section 4504b of the Code. The major advantage of load-center distribution is obtained by placing the substations at the load-center irrespective of where the supply conductors enter the building.

The protection employed is at variance with Section 7141 of the Code as it becomes impractical to provide overcurrent protection on the primary of each transformer. Therefore, three or four small transformers are connected to one feeder without a breaker ahead of each transformer. Short-circuit protection for the several transformers on a given primary feeder is obtained from one breaker at the source of the primary feeder. Where overload protection of individual transformers is desired, breakers in the secondary transformer may be set to trip at the desired load level or to be tripped on transformer temperature. The Code section 7141 should be changed to distinguish between overload protection and short-circuit protection of transformers, and should permit short-circuit protection of several transformers by one primary breaker.

The general principles involved in reducing the demand for copper in connection with the electrical power supply has been summarized by D. M. Jones, manager, central station engineering department, General Electric Co., in the box on Page 63.

Ceiling on Wages; Further Restrictions

President's proclamation being effected; prices to hold by cutting overhead; month's war rulings listed

THREE days after the last number was closed President Roosevelt issued a long needed proclamation freezing wages, salaries, income levels. By the end of October it was still being implemented and employers were cautioned not to put into effect any increases until okayed by the War Labor Board or Treasury Department. Status of many increases under negotiation at the time of the freeze will have to be certified under the proclamation.

Only inkling of what OPA's policy will be regarding granting lifts in price ceilings where wage rates have been increased since March, such as in servicing of appliances and wiring installation, is contained in a talk by Leon Henderson to a retail trade and services meeting Sept. 29-30. In it he advised cutting frills and overhead as a means of staying under the price ceiling despite increased costs. He also warned that retailing had to decline with more and more curtailment of stocks and materials.

Notice must be given OPA under definite rules of any intended rate increase by utilities before the regulatory body may approve.

Domestic ranges were further tied by rulings under the utility PR order P-46 which prohibit extending an additional service line to a residence already equipped with either a gas or 3-wire electric range service line. If a person moves to a residence not equipped to serve his range, either gas or electric, he has to buy a new range to fit the service, trading in his own range

Vacuum cleaners in stock of manufacturers, wholesalers and retailers were frozen, Oct. 24 and may be sold only to Army, Navy, lend-lease, etc. Second-hand cleaners were not affected by L-18-C.

Utility repair and maintenance order P-46 was revised to require much higher ratings to obtain materials, tighten WPB controls on volume of material which may be used on inventory. It requires much more obtaining of materials from other utilities, limiting to 15% the amount that can come from suppliers.

Fluorescent lighting fixture order L-78 was amended Oct. 19 to clarify restrictions on manufacture of fixtures and prescribe conditions under which they can be sold. Those interested should obtain copies.

Flashlights and batteries felt their first curtailment under L-71 which prescribed limits on the quantity each manufacturer could make for civilian use. Total production was cut to 35% of 1941, batteries to 50%. Smaller companies will be allowed greater production.

X-ray equipment production and sale came under rigid control with L-206, Oct. 21. It prohibits manufacture of any equipment except that required by the Army and Navy and sale to anyone outside the armed forces except under high priority.

Air conditioning and commercial refrigeration equipment was restricted still more to conserve stocks for wartime uses but the freeze order covering dealers' and distributors' stocks was lifted to allow sale of units on hand.

Emergency ratings for small amounts of critical materials to prevent actual stoppages or shutdowns of essential production can now be obtained from WPB field offices. The urgency has to be truly serious.

Other significant happenings—WPB asked businessmen to go to their regional or field offices before coming to Washington. A suspension order was issued by WPB against Rutkin Electrical Sales Co. in Los Angeles for filling an unrated order for 52,278 ft. of wire. Two booklets of interest—*Priorities and Industry* by WPB. Manual No. 2, *How the service price regulation applies to the service trades.*

Commercial motor vehicles of *all* kinds come under ODT order 21, effective Nov. 15, which requires a Certificate of War Necessity.

What's Behind the Name-Plate of Fractional H-P. Motors?--II

CONTINUED from last month, the following tables are to assist in clarifying the meaning of name-plate markings of some of the more frequently encountered makes and types of fractional horsepower motors.

	A. C. MOTORS			UNIVERSAL			D. C. MOTORS		
	1-2-3 Phase	Polyphase		A. C. & D. C. Motors			Windings		
Manufacturer	Synch.	Square Cage	Wound Rotor	Noncompensating	Compensated	Governer Cont.	Shunt	Comp.	Series
Advance Electric		PC	PV						
Baldor Electric		M MM					D	D	D
Black & Decker		P		CS	CS C		S	C	
Bodine Electric	NSY1 NYC2 NYP3	AE NPP	AE NPP	SM VC NSE		Add letter	EB SD NSH	EB SD NCO	DSM NSE VC
Brown & Brockmeyer		PM					DM	DM	DM
Century Electric	YSC	SC SCL	SSR				DM DN	DM DN	DM DN
Crocker Wheeler		A	A				F L	F L	F F
Diehl Electric		GBP GSP XP ZP		BR BU GL HR RU	GLH R	BR BU RU	LG XD ZD	LG XD ZD	LG XD ZD
Dumore Electric				AK EEB EEX GM KB SAX	GM				
Electric Specialty Co.	BR JKB	BF BL KB	BLR BR				JH LF RL	JH LF RL	JH LF RL
Emerson Electric	SN	P				U	D	D	D
Fidelity Electric		AP APB APH	APW APWB	SU	SCU		EI EP PB	EC PC PCB	"Series"
General Electric	SH SK	K RKQ RKT	M	PBA SDA	PR RSC	PG	BC BN SD RSD	BC SD RSD	BA PD SDA
Holtzer Cabot Co.	RBC RBS RWC RWS	CBT COT CRT CWT RBT RWT	CBT COT CRT CWT RBT RWT	RBU RWU	RBU RWU		CBD COD CRD CWD	CBD COD CRD CWD	CBD COD CRD CWD
Howell Electric		SC SCE	SR						
Imperial Electric		EEN EH	W						
Jannette Manufacturing Co.	KA KC KS KU	PA PC PD PE PF PS	WPC WPE WPF WPP	U		UG	DA DC DD DE DF DS DU	DA DC DD DE DF DS DU	DA DC DD DE DF DS DU
Kingston Conley Co.		3B 3P							
Leland Electric		P					D	D	D
Marathon Electric		QS TS		U			DS	DP	DU
Ohio Electric	SN	P					D	D	D
Peerless		P					W	W	W
Reynolds Electric Co.	SSB SSC SSD	TIC TID					SN SO SP	CN CO CP	EN EO
Robbins & Meyers	SK SL SS	L LF LG LH		B	B		D	D	D
Signal Electric				CB GB GL LJ QB			AGE CB FI GB GJ J KO LJ QB		AGE CB GB FIJ GJ KO LJ QB
Star Electric		AAH NNH	S AS				C CH SB SH	C CH SB SH	C CH SB SH
B. F. Sturtevant		IS ISP		UV	UV		O	O	O UV
Wagner Electric	RBC4 RPC5	RP	RS				RD	RD	RD
Wesche Electric		N NB	NR NBR				H HB	H HB	H HB
Westinghouse Electric & Mfg.	FBH FBI FBJ FBS	CS CSA FS	CW FW	ADS	AD	AD ADS	CD CDH FK SKL	CD FK SKL	CD FI FK SF SKL

Notes—1, Split phase. 2, Capacitor type. 3, Three phase. 4, Single phase. 5. Polyphase.

ADDITIONAL TYPE MARKINGS—Continued on Page 66

ADDITIONAL TYPE MARKINGS—Continued from page 65

General Electric

AY, AZ, BY, KY, LY, Y—Special design.
D—Dynamotors.
H—Synchronous converters.
J.A.—Selsyn without dampers.
JD—Selsyn with dampers and special frame.
J.D.A.—Selsyn with dampers.
KX—Reactor starting.
MJ—Power type selsyn.
N—Hysteresis motors.
NC—Hysteresis capacitor
NSP—Hysteresis shaded poles.
PE—Tapped series motors.
PF—Shunted series motors.
PS—Split series motors.
PY—Special design series.
SC—Synchronous capacitor.
SSA, SAS—Sync. split phase wound rot.
SM—Synchronous inductor motor.
SX—Synchronous reactor start.
YA—Induction disk and similar sync.

Robbins & Meyers

KLX, KSX, RX—Short hour motors.
L—Polyphase nonexcited synchronous.
LF—Polyphase norm. torque low start I.
LG—Polyphase double cage motors.
LH—Polyphase high slip motors.
LLF—Standard polyphase squirrel cage.
SK—Capacitor type nonexcited sync.
SL—Polyphase nonexcited synchronous.
SS—Split phase nonexcited synchronous.

Star Electric

A—Old style ball bearing.
ARH, NRH—Reversible crane type.
H—All motors for hoists and cranes.
AR, NR—Non-reversible.
KB, KQ—Capacitor, normal start.
KY—Capacitor, high start torque.
N—NEMA. Ball-bearing.
S—Ball bearing.
SS—Sleeve bearing, wool packed.

Dimout III—Down Another Notch

Window lighting controlled, street lights capped industrial lighting under permit in new order

REALLY to be expected was the further restriction of all lighting contributing to sky glow, for Proclamation 10 did not specifically restrict street, window or industrial lighting, even though it did have as its purpose the elimination of sky glow. It could be regarded as a second step in reducing the hazards to shipping and to cities themselves. Each step, the Office of Civilian Defense for the 9th Region has been careful and considerate to take only as necessity demanded and with the least possible disruption of civilian comfort and safety.

Proclamation 12 was issued Oct. 10, to be effective Oct. 25 except for street and highway lights, which becomes effective Nov. 12. This exception was to give the utilities and public officials time to handle the light control of the many thousands of lighting units involved. Proclamation 12 is in reality Proclamation 10 amended.

First change is that including illuminated poster panels in theater lobbies as among the sources of light to be extinguished. All *light sources* which emit direct rays above the horizontal out of doors are also to be extinguished—or so shielded as not to emit such direct rays. *Light sources* is defined to include "light generating elements and the bright portion of any reflector, lens, luminaire, transparency or other equipment associated herewith for the control or diffusion of light."

By this provision the dimout requires virtually every home in the dimout area to lower shades after sundown so as to eliminate the possibility of light from a lamp being emitted or reflected above the horizontal out of doors. Previously only windows from which light might be visibe from the sea were covered.

"Outdoor structures and roofs" is added to the list of areas on which the illumination shall not exceed one footcandle. Window lighting was formerly allowed to spill light of higher than 1 fc. on the sidewalk outside, but under the revised order, "*All interior lighting of every description shall be reduced or controlled so that it does not contribute more than 1 fc. of illumination upon any outdoor area.*"

This requirement means that window lighting must be so directed into the window or so screened by sheer cloth or venetian blinds that the spill light from it reaching the sidewalk outside will not contribute more than 1 fc. of light. Venetian blinds so used, can have their vanes on a flat horizontal plane, but in order to reduce the possibility of themselves being too bright a reflecting medium, the top of each vane should be of a dark color.

Street lighting, heretofore required shielded only when visible from the sea, was brought under severe restriction in the next provision, which applies to the entire dimout region, not alone that visible from the sea.

"*All street and highway lights shall also be shielded so that each light source emits no more than 10% of its total lamp lumens at angles above the horizontal. Provided the foregoing requirements are met, any further reduction or extinguishment of street or highway illumination which would unnecessarily aggravate traffic hazards is not required.*"

This provision set all utilities in the entire region scratching for means to control the upward light of street lamps in view of the restrictions on materials. Metals for shields were impossible to obtain. Other materials presented questions of their ability to withstand wind, rain, sun and permit maintenance of the lighting unit. Expense, too, was a big factor. A number of ingenious methods have been developed. Among these are a cement cone sprayed on cheescloth (illustrated here) used by Pacific Gas and Electric Co.; cloth caps, treated for weatherproofing; and in Huntington Park, W. J. Tretheway, city electrician, devised a means by dipping a suitably sized paper carton in roofing tar to weatherproof it. Next month more details of some of these methods will be told and illustrated in this magazine.

PG and E's cement and cheesecloth cone

In the previous order industrial illumination was merely asked to be reduced, if possible. No industrial felt it was possible, so the new order only allows illumination which violates the general order under special permit and each case will be checked before a permit is issued. A letter requesting the deviation must be written to the 9th Regional OCD in San Francisco. A temporary permit will be issued until the case can be investigated by a light control deputy and then a specific permit issued only on special considerations of necessity.

Other changes in the Proclamation require that traffic signal and traffic sign lighting be controlled to prevent light emission above the horizontal; specify that authorized emergency vehicles, such as fire truck on the way to a fire, may use full lights; define some adjacent area near those visible from the sea (such as a depression or valley) as included; and require state and local governmental bodies to enforce the proclamation. In the latter connection a model emergency ordinance has been prepared by the OCD and recommended to cities for passage.

War Bond Plan Works Cooperatively

San Francisco contractors and union solve difficulties in pay roll deduction for day-basis transient workmen

FIRST of its kind in the Nation, a war bond savings bureau has been established jointly by the San Francisco Electrical Contractors Assn. and International Brotherhood of Electrical Workers, No. 6, of San Francisco, with official commendation by Treasury Dept. officials. In order to make effective the weekly pay roll 10% deduction plan for buying of bonds in an industry in which workers are on a day and hour basis rather than monthly salary, considerable planning was necessary. As a result, an Electrical War Bond Savings Bureau has been established at 1434 Howard St. under a joint committee of both organizations. Representing the contractors are C. B. Kenney, chairman, and Clyde L. Chamblin, secretary. Representing the union are William Gimmel and Michael Lynch.

Engineer of the plan from the Treasury Dept. war savings staff was Robert P. Etienne who feels that the pattern developed in this first such cooperative bureau will be followed in many other industries where workmen are hired on a day-to-day basis making it difficult for any one employer to work out a pay roll deduction plan for bond purchase.

Operation of the bureau is about as follows. The contractors and the union have distributed to electrical workers a card upon which they can pledge deductions from their pay and authorize the bureau to collect for their account. This card authorizes the employer to deduct 10% from the man's earnings every pay period and mail the deduction to be deposited to his account for the purchase of U. S. Series E War Bonds.

Inaugurating the Electrical War Bond Savings Bureau were C. B. Kenney, chairman, joint committee; M. Lynch, IBEW committeeman; George Abbett, president, electrical contractors; Clyde Chamblin, committee secretary; Charles Foehn, business agent, IBEW No. 6; William Gimmel, IBEW committeeman; Dan Flanagan, AF of L Western representative; B. W. Hubley, auditor who set up the procedures

The employer then fills out a weekly report sheet listing the employees, their Social eScurity numbers, their wages and the deductions and sends a check for the total deductions to the bureau to be accredited to the bond account of each employee.

The bureau allows the account to accumulate to the credit of each man until sufficient is held to purchase a bond. For convenience, bonds will be purchased once each month unless a man requests it immediately.

Administration of the bureau is supervised by the joint committee. The bureau employs a girl to keep the records. The electrical contractors association has furnished office space and furniture at 1434 Howard St., its own headquarters. No money is handled by the organization, the deductions being paid in by check to the bureau, banked, and bonds purchased by check countersigned by a member of both union and association. Cost of maintaining the bureau is borne equally by union and association, each having contributed $500 initially to place the bureau in operation. No fee is charged those who buy bonds.

Electrical contractors themselves will place their purchases of war bonds through the bureau, said George Abbett, president of the association, and will make an effort to interest other groups in the electrical industry to do the same in order to make it a truly cooperative and a patriotic organization. The union, according to Charles Foehn, business agent, will conduct a strong campaign to secure the 10% purchase pledges.

TO THE

ELECTRICAL WAR BOND SAVINGS BUREAU

You are hereby authorized to notify my employer, whoever he may be, from time to time, to deduct 10% from my earnings every pay day period and mail such deduction to you to be deposited to my account for the purchase of U. S. Series E War Bonds.

If there is any credit balance in a War Savings Account at the firm where I am now working, please instruct my employer to turn this account and balance over to you to be deposited at the War Bond Savings Bureau Official Bank.

Please register Bonds bought for my Account in the manner shown below.

I understand that no interest is to be paid by the company on any accumulated funds.

Register bonds in the name of and deliver to:

(circle one)

Miss / Mrs. / Mr. .....

(Show given name, middle name or initial, and surname)

.....

(Number and street) City or town)

Address of Co-owner or beneficiary if different from above—

Miss / Mrs. / Mr. .....

(Show given name, middle name or initial, and surname)

.....

(Number and street) City or town)

.....

(Signature)

ELECTRICAL WEST

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Morale Builder

WHATEVER disposition the future may make of plans for similar conferences, there is only one comment that fits last month's PCEA conclave at Fresno: This doubly successful meeting demonstrated beyond question that even in the midst of a war, there is a definite need for such conferences. Executives who control the destiny of meetings like that one might well ponder some of the tangible benefits evidenced at Fresno before they shelve all conclaves for the duration.

Discussion groups again demonstrated that there is no better way of finding out what the other fellow is doing than by talking to him. Also that one idea advanced stimulates another. All of the companies represented will benefit from the many ingenious ideas and plans interchanged. Covering everything from emergency maintenance techniques to uses of all manner of substitutes, these suggestions proved that American ingenuity and inventiveness is at its best when the emergency is the greatest.

But there was another benefit, inherent in all such meetings, and never more tangibly shown than during such times as these. Morale takes a terrific beating under the stresses of emergency and adversity. Limitations and restrictions of normal habits, increased financial burdens, speculation on the future, wonder over the value of present personal effort in the war program—all of these create distractions and dissatisfaction. To meet with fellows faced with similar problems in other areas, to hear how they are meeting them, to become vitally interested in the job at hand, is like a shot in the arm. There will be many who return to their jobs with a new feeling of assurance and a renewed interest.

Money won't buy that. Only such a meeting as the one at Fresno will create it.

Sabotage by Renegotiation

IT is over such ill-though-out legislation as Public Law 528, on the renegotiation of contracts, that wonder arises whether this government is really interested in winning a difficult war or in taking advantage of the war to promote so-called social gains. Certainly no piece of legislation sabotages incentive to produce war materials for the government at the lowest cost more than this legal device to "take the profit out of war."

Profit can be taken out by income taxes without placing war contracts under a cloud of uncertainty (for as long as three years after the war), complex accounting, bickering, and ham-stringing of research and development. The law penalizes the lump sum contract which stimulates efficiency, speed, and economy. It encourages the wasteful, expensive, slow cost-plus contract that will make the war cost more than it should.

Another case of failing to understand what incentives have always produced *results*.

Light for Victory

AS THE GRIMNESS of war dims down the lights along our seacoasts more and more, there should awaken in the hearts of electrical people a resolve to celebrate the victory that must ultimately come to the United Nations with LIGHT. William P. Bear, PG and E illuminating engineer, suggests as an idea for the numerous agencies concerned with postwar planning, the setting of a day of celebration when, throughout the nation, lights shall blaze as they did in the days before Pearl Harbor. Particularly should this be done in those areas where wartime emergencies have brought dimouts.

"Immediately the war is over," he says, "let us turn on the light and make the act a very real part of the celebration that will signalize an American victory. In our homes and backyards, in our clubs and schools, in our shops and stores, on our recreation fields, in our factories or work yards, on our streets and highways—everywhere, lights could be made to blaze again, thus signifying that people the world over are once more free."

This worthy idea means that plans must be evolved, that steps be taken to insure universal participation. Perhaps it is too early now actually to foresee all of the steps and to program such an activity carefully, but the idea can be planted. With a word or two of publicity, it might be made to blossom spontaneously. The American public is like that, as those who remember November 11, 1918, can well testify.

"This Is the People's War"

MAYBE it is a far cry from a motion picture about wartime living in England to the everyday affairs of the electrical industry on the Pacific Coast. We don't think so. Instead we would recommend that every man and woman in the industry, and their families as well, see the picture, *Mrs. Miniver*. The same recommendation could go for all American industries and all American workmen who are even remotely working on the machines of war. If the American people must be aroused to anger in order to produce for victory, *Mrs. Miniver* will do it. If hatred for our enemies must be made to burn in American hearts, *Mrs. Miniver* will kindle it. If the stark realities of war have not yet been brought home to Americans, *Mrs. Miniver* will achieve it.

The motion picture industry won new laurels when it gave life and voice to the vicar standing among the ruins of his bombed church and saying to his people:

" . . . The homes of many of us have been destroyed and the lives of young and old have been taken. There's scarcely a household that hasn't been struck to the heart. And why? Surely you must have asked yourself this question. Why, in all conscience, should these be the ones to suffer? Children, old people, a young girl at the height of her loveliness. Why these? Are these our soldiers? Are these our fighters? Why should they be sacrified? I shall tell you why. Because this is not only a war of soldiers in uniform, it is a war of the people—of all the people—and it must be fought, not only in the battlefield, but in the cities and in the villages, in the factories and on farms, in the homes and in the heart of every man, woman and child who love freedom! Well, we have buried our dead but we shall not forget them. Instead they will inspire us with an unbreakable determination to free ourselves and those who come after us from the tyranny and terror that threaten to strike us down. This is the people's war. It is our war! We are the fighters! Fight it then! Fight it with all that is in us!

"And may God defend the right."

A Contribution to Victory

A LAYMAN recently asked if any power shortage had interfered with the war effort here in the Far West. His inquiry was prompted by remembrance of the power shortage publicity inspired by the advocates of further power development by the Federal government. Investigation shows that no single war activity in the West, from Army cantonment to huge industrial plant, has been held up by any failure to provide essential electric service. In every instance power has been available, even if it has been necessary to use improvised equipment until that which had been ordered could be delivered. Furthermore in most instances power has been ready days and weeks ahead of actual requirements. This is a contribution toward the victory drive of which the whole industry can well be proud. Perhaps it will be recognized with an Army-Navy E or Maritime M pennant. It deserves such recognition.

THERE is going to be a lot of power for sale here in the Northwest area after the war is over. Don't be fooled by the talk you are now hearing about shortages and unserved demands. The shutting down of one or two war plants alone could change the power outlook of the whole Northwest. This power, when it becomes available, is not going to be taken by a few big industrial customers, but instead is going to have to be sold as power has in the past—to the home, the farm, the store and the factory. You know in normal times, demands just don't happen, they have to be created. The sale of electricity, not unlike other forms of merchandising, takes a trained sales organization, plenty of patience and a coordinated plan. While electricity in the home for lighting purposes may be said to be a necessity for which there is no substitute, beyond this we are in constant competition. . . . Remember that the housewife does not have *to buy the new and better light, the washing machine, range, refrigerator or other device. In other fields of service we are even less free from actual competition from other sources of power. We have no monopoly on the right to generate electricity. Many large power customers could, if our rates were not right, furnish their own power. In short, we are free neither from competition nor from the power of customers choice in any field of our service.*—A. S. Cummins, president, The California Oregon Power Co.

Electric incubators hatch healthy chicks

POULTRY EQUIPMENT AND KWH USE

California Committee on Relation of Electricity to Agriculture makes detailed four-year survey

By J. R. Tavernetti
University of California

DURING the years 1938 to 1942, the California Committee on the Relation of Electricity to Agriculture conducted a study of the energy consumption of electrically operated poultry equipment. This study was made with equipment that was operated on poultry farms in the vicinities of Sacramento, Fresno, Petaluma, and Santa Rosa. Data were obtained by installing watthour meters on the different equipment and by observation. The equipment studied included incubators, brooders, poultry house lights, egg cleaners, and egg graders.

Use of incubators on poultry farms was limited due to the common practice of buying chicks from commercial hatcheries. Table I, however, is a summary of the data on several incubators of various sizes that were in use on farms. All of the units had forced-air circulation except the 540-egg size which was the flat top type. The connected load for the various incubators ranged from 33 to 85 watts per 100 eggs with 33 to 40 watts being most common. The energy consumption varied from a minimum of 5 kwh. per 100 eggs per hatch for the largest incubators to a maximum of 15 kwh. for the smallest incubators.

Brooders

The use of electric brooders was common practice on many poultry farms. In the areas where the study was conducted practically all of the brooders were the indoor hover type, although a few battery brooders were used for meat birds. The study was made during the months from February to May and included eight different makes of hover brooders and three different makes of battery brooders, as well as several brooders with homemade hovers and commercial heating units. Table II presents a summary of the data according to the type of brooder and the kind of birds brooded, while in Table III is a summary of the data on the hover brooders arranged according to size.

Brooder Operation

Methods of operating the brooders varied widely with different poultrymen, and the energy consumption was determined more by the construction of the house in which it was located and the brooding practices of the individual than by the particular type or make of brooder. The starting temperatures varied from 86°F to 103°F with 90°F to 95°F being the most common. In some cases, no thermometer was used and the comfort of the birds was the criterion in regulating the temperature. Common practice was gradually to lower the temperature to a minimum of 70° to 80°F as the birds grew older. In general, the lowering of the temperature was accomplished by changing the thermostat setting, but in some cases the hover was merely raised and the thermostat not changed.

The brooding period varied from three to eight weeks with five to six weeks being most common. The number of birds put under the hovers was less than the rated capacities in all the 750- and 1000-chick sizes and in most of the

Table I. Summary of Data on Electric Incubators

Number of incubators	Capacity per incubator, eggs	Connected load per incubator, watts	Connected load per 100 eggs, watts	Kwh. used per 100 eggs per hatch
3	5,600	2,000	37.7	5.0
1	2,700	1,000	37.0	7.7
2	1,400	1,000	71.5	8.8
1	1,200	400	33.3	9.3
1	600	240	60.0	15.5
1	540	460	85.3	14.8

Table II. Summary of Data on All Electric Brooders

Type of Brooder Kind of Birds Number of Brooders	Hover Chicks 70		Hover Poults 25		Battery Chicks 6	
	Range	Ave.	Range	Ave.	Range	Ave.
Rated chick capacity per brooder...	350-1,000	730	500-1,000	750	500-1,000	780
Actual birds per brooder.....	280- 800	510	240- 350	282	600-1,000	780
Per cent of rated capacity.....	42- 100	69	.30- .52	.38		100
Connected load per brooder, watts..	300-2,000	1,300	500-2,000	1,450	500-1,500	990
Connected load per chick, watts....	.7- 4.0	2.5	2.1- 6.4	5.1	.55- 2.1	1.3
Kwh. per bird per brood.....	.17- 2.20	.71	1.24- 1.80	1.50		
Kwh. per bird per day.....	.004- .052	.018	.030- .041	.035	.07- .024	.0135
Number of days brooded.....	20- 56	40	35- 45	42	7- 22	17

500- and 350-chick sizes. The percentage of birds put under the brooders in relation to the rated capacity increased as the hover size decreased. It ranged from an average of 64% with the 1000-chick size to 86% with the 350-chick size. In the battery brooders the number of birds was usually equal to, and in some cases more than, the rated capacities. With these brooders, however, the birds were kept in them only from one to three weeks and then moved to hover brooders.

The connected load of the hover brooders averaged approximately 1¾ watts per chick on a basis of rated capacity, but averaged 2½ watts on a basis of actual chicks brooded. The energy consumption of the hover brooders averaged .71 kwh. per chick per brood or .018 kwh. per chick per day. From two-thirds to three-fourths of the energy consumption was used in the first half of the brooding period. The brooders, which used high temperature heating elements and depended mainly on radiation for heating, had a connected load about double and an energy consumption of 50% to 75% more than the brooders using low temperature elements and convection or forced-air circulation. In the battery brooders, the energy consumption averaged .013 kwh. per chick per day.

When the brooders were used for poults, the capacity was approximately one-half and the connected load and energy consumption per bird double that for chicks.

Hover brooders use an average of .71 kwh. per chick per brood, the study shows

Poultry House Lighting

Lighting of poultry houses during the late fall, winter, and early spring months was a common practice on most poultry farms. In general, the lights were used only in the morning, but on a few farms they were used both in the evening and in the morning, and on some farms they were left on all night. Table IV gives a summary of the data on lighting. The size of lights used was generally between 25 and 50 watts, with an average connected load of 34 watts per 100 hens. The length of time they were used was generally between 2 and 4 hours per day and the energy consumption averaged 3.9 kwh. per 100 hens per month.

Egg Graders and Cleaners

Use of egg graders and egg cleaners was very limited as this work was usually done by hand. Observations were made on one grader and two cleaners. The grader which was a commercial machine was operated by a 1/20-hp. motor and had a capacity of about 10 cases per hour. One of the cleaners was a commercial machine operated by a ¼-hp. motor and using revolving rings of sandpaper. The eggs were placed in a holder and were automatically turned and cleaned. The other cleaner was a homemade unit consisting of a 2-in. wide emery cloth belt driven by a ¼-hp. motor. With this unit, the eggs were held and turned by hand using the emery cloth as a buffer. The capacities of the cleaners varied according to the amount of cleaning required per egg. In one observation on the homemade unit, two men graded and cleaned a case of eggs in 10 minutes. The eggs, however, were relatively clean since only 80 eggs out of the case required any cleaning.

Table III. Summary of Data on Electric Chick Brooders by Size

Rated Chick Capacity per Brooder Number of Brooders	1,000 30		750 7		500 29		350 4	
	Range	Ave.	Range	Ave.	Range	Ave.	Range	Ave.
Actual chicks per brooder	500- 800	635	500- 650	570	208- 500	395	280- 350	302
Per cent of rated capacity	50- 80	64	67- 87	76	42- 100	79	80- 100	86
Connected load per brooder, watts	880-2,000	1,790	1,000-1,600	1,400	350-1,320	875	300- 660	460
Connected load per chick, watts	1.4- 4.0	2.8	1.9- 3.2	2.5	.7- 2.64	2.2	.9- 2.2	1.5
Total kwh. per brood	105- 918	405	104- 833	376	130- 661.	332	75- 164	115
Kwh. per chick per brood	.18- 1.84	.64	.17- 1.57	.66	.41- 2.20	.84	.25- .47	.38
Kwh. per chick per day	.009- .047	.016	.004- .033	.019	.01- .052	.020	.006- .013	.009
Number of days brooded	20- 50	40	24- 48	37	28- 56	41	35- 44	41

Table IV. Summary of Data on Poultry House Lighting

	Range	Ave.
Size of lights used, watts	15-100	45
Connected load per 100 hens, watts	23-73	34
Hours per day used	2-12	3.8
Kwh. per 100 hens per month	2-6.6	3.9

Greenhouse Equipped To "Dial" Weather

ARTIFICIAL sunshine from fluorescent lamps and artificial weather by air conditioning in one of the world's most modern greenhouses is the setting for research in plant growth at the California Institute of Technology in Pasadena. Valuable contributions to science's knowledge of plants are being developed there under the direction of Dr. F. W. Went, professor of plant physiology.

The greenhouse has two windowless, insulated experimental rooms where fluorescent lamps lining the ceiling produce illumination closely approximating daylight. Per panel of 5 x 5 ft. are installed two 80-watt Cooper-Hewitt fluorescent lamps and 10 to 14 40-watt daylight fluorescent Mazda lamps. This light is sufficient to grow plants except those requiring the highest intensities.

Each room has an electrically operated air conditioning system providing automatically any desired temperature and humidity. The refrigerating machine is powered by a 5-hp. motor, the fans by 1 to 1½-hp. motors and the spray pumps by 1 to 1½-hp. motors.

With these facilities placing growth conditions entirely under manual control, Dr. Went and his assistants can produce any weather condition required by the particular experiment in progress. They may "dial" the tropics or the desert, make the "sun shine" as many hours a day as desired, and produce conditions prevailing at any season of the year.

Experiments are proceeding with many types of plants to determine whether they will grow satisfactorily in artificial light, without daylight; whether some plants can be grown with continuous artificial light; how many hours of light and darkness various plants require, and how many hours of light various plants require for flowering.

While complete results are not yet available, the experiments at the present time show that in a number of cases, such as with cotton and tobacco, artificial light may replace daylight entirely with results as satisfactory, and sometimes better.

Electric Fences

Greater Use Would Save Huge Quantities of Critical Materials

THAT electric fencing is capable of saving huge quantities of two of the most important elements in the wartime economy—critical materials and farm labor—is the contention of the Electric Fence Manufacturers' Assn. in a presentation prepared for the Office of Agricultural Defense Relations, USDA, and the WPB. Purpose of the study is to insure sufficient materials for the manufacture of controller equipment and accessories to meet expanding farm requirements.

Based on surveys of over 1,000 electric fence installations an average electric fence (2.2 mi.) would require 13.4 lb. of materials in the production of a controller and would save 6,333 lb. of materials in erection as compared with standard fencing. The labor saved in erection would be 26.75 man-days. Principal material savings would be in steel, copper and zinc. Extending the study to cover only the production of electric fence controllers for 1940 (it is believed that current requirements will be even greater) indicates an overall saving of 759,960 tons of materials.

Analyses of typical fence material sales show that on the average 80% are for 4-strand barbed wire construction and 20% for woven wire construction surmounted by two strands of barbed wire. In an electric fence installation the former type of conventional fence would be replaced by a single barbed wire and the latter by two energized strands. Furthermore, in the case of conventional fencing, posts are usually placed one rod apart, whereas 50 ft. is the customary distance with electric fences. The report to the USDA and the WPB shows also that application of an electric controller and a moderate quantity of accessories will convert one mile of existing 4-strand barbed wire fence into four miles of electric fence.

Emphasis is placed on the fact that electric fencing is flexible in application in that it can be used for permanent fencing as well as temporary fencing because it can be easily and quickly erected. It is pointed out also that equipment of reputable manufacturers conforms to state safety requirements as well as Underwriter's Laboratories specifications.

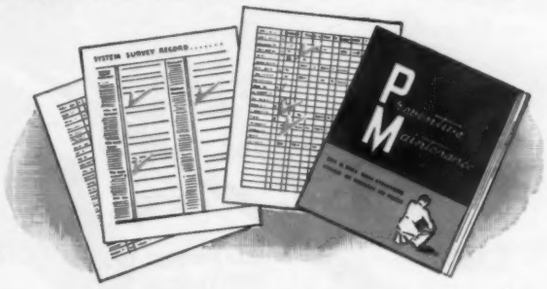
How electric fencing can contribute to the war program is summarized in the statement as follows:

"Now, since the maximum use must be made of available materials and labor, electric fencing contributes something more than reduced costs. It is the only solution in sight to the farmers' problem of greater fencing needs with less material and labor to supply those needs."

Two months of controlled greenhouse conditions produced the hardy tomato plants at left below. Center: Tomato plants started at the same time and grown under natural conditions are smaller than the "controlled" plants. Right: A flat of California native plants is progressing in Cal Tech greenhouse

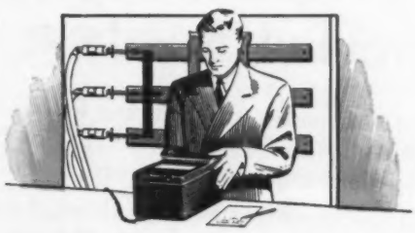
How to stop production losses through Anaconda's PREVENTIVE MAINTENANCE Plan

1 **Send for this plan designed to prevent electrical system failures before they develop.**



With raw materials so critical—copper and rubber especially—Anaconda has developed a plan to help industry protect its electrical systems and at the same time, conserve critical materials. It is a practical, simplified manual prepared to meet wartime conditions.

2 **Use this plan periodically to check your electrical system for imminent failure.**



Manual includes special charts for analyzing your plant's electrical system, and for keeping a running check on its condition. Automatically uncovers danger spots . . . suggests a practical remedy for potential weaknesses.

3 **If the plan uncovers any critical complications, consult with Anaconda engineers.**

On critical problems, we offer the services of our engineering department and field service staff without cost.

NOTE: The Preventive Maintenance Plan will aid your local W.P.B. Branch in making its decision on your request for material required to avert an actual breakdown. 42277

"Tomorrow may be too late . . . do it today!"

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

ANACONDA

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda PM Plan, including posters, extra check charts, etc.

Individual .....

Company .....

Address ..... City .....

11K

America needs a Food Administrator – NOW

IN war or in peace, you and your fellow Americans require 1,465 lbs. (raw weight) of food every year. Soldiers require even more.

In all, for ourselves and our allies, America must produce, process and transport 250 billion pounds of food per year, for the duration, and for many years thereafter.

► Don't try to remember that figure, but *do* remember that food processing is a huge industry, in a high state of technical development, but not yet fully coordinated into the war effort.

The food industry needs over-all coordination, comparable to long-last rubber coordination. America needs an administrator of food supply; to assure priorities in equipment and transportation and to end conflicting and overlapping committee jurisdiction.

If the food supply gets into a tangle, through lack of a comprehensive plan, the result will make the rubber shortage seem a picnic in comparison.

► In the impending pandemonium, the Food Production Engineer will be strictly in the middle. He is neither a grower nor a global strategist, but a production man who must needs wait for government to call its shots on growing, equipment production and distribution.

The Food Production Engineer must see that the food is grown in proper quantities, at proper distances from his plant, and delivered in perfect condition . . . From that moment, he has all the problems of ordinary manufacturing, plus the job of contriving to retain the fleeting qualities of color, aroma, taste, texture and nutritive value which nature intended only for a few brief hours of ripeness.

That was tough to do, even in the days of unlimited refrigeration and canning. But under the urge of saving cargo space for men and munitions, new miracles have been worked.

Fortunately for us, in the continuous battle between bulk and low cubic content, the latter is winning.

Food Production Engineers—by developing machines and processes for trimming and compressing—have reduced whole sides of beef to a carton the size of a suit box.

► They have replaced sunken refrigerator ships by lining the holds of ordinary cargo vessels with boxes of frozen lard. Preserved by this Yankee "ice house" trick, frozen meats arrive overseas in perfect condition—while the lard goes to allied explosives plants for making TNT.

Eggs, stripped of their shells, travel through a fabulous array of processing machines, leaving space-taking water in America, but sending every ounce of energy-giving food value to our far-flung armies and allies.

When the Food Processor gets through with a basket of ripe tomatoes, you can hold the resulting cellophaned package in the palm of your hand . . . and only replaceable water has been lost.

► The work these men are doing will easily be the equivalent of launching a ship a day, as the processes which have been perfected are applied in more and more food plants.

If, under the constant pressure of tire, tin, and freight-car shortages, you find yourself sitting down to meals of dehyrated meats, fruits and vegetables, you can thank the Food Production Engineer for the fact that the tomato dishes will be ripe—red and delicious in taste, that soups are full-flavored and nourishing. That nothing has been lost but the water you have replaced.

Reprints of this advertisement are available in handy booklet form.

McGRAW-HILL PUBLISHING COMPANY, Inc.

330 WEST 42ND STREET • • NEW YORK

This advertisement appeared in a group of newspapers on Tuesday, October 13, 1942

How do you get the cube root of a cow?

READ the newspaper advertisement, reprinted opposite, and you'll see we are telling the public (and government) about the job engineers are doing in stuffing bigger food production into fewer ships.

When you get to that part of the ad that tells about Food Engineers reducing a cow's carcass to the size of a couple of suit boxes, you will have reached the point where McGraw-Hill really lives.

In Food Production, too, it's our job to collect the "how-to-do-it" news on each new advance in technology and equipment, and pass on this information to an entire industry.

The Industrial Press of America implements the exchange of ideas, which is a national characteristic and one of the secrets of our industrial development.

Through the interchange of ideas, made possible by the Industrial Press, the sum of American technical genius is greater than the sum of its parts.

If a food engineer in Illinois learns how to add and control Vitamin A in a food product, all food manufacturers learn how it was done, through a magazine like FOOD INDUSTRIES.*

If a manufacturer develops a new dehydrating machine, production men learn what it will do and how it operates, through the informative and helpful advertising that is characteristic of the Industrial Press.

No matter what your industry or your job, you can probably remember many instances where an industrial magazine has helped you find a solution to a production problem.

But valuable as they are, Industrial Magazines cost only a few dollars per year.

That's why the route slip is so puzzling. If a man needs to see a magazine at all, he should not be under pressure to pass it along.

For help in studying the proper distribution of technical magazines among the men in your organization, write to the Reading Counsellor, c/o McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York.

★ ★ ★

THE McGRAW-HILL NETWORK

23 publications, which gather "war-news" from the "war-production-front" through a staff of 153 editors and 725 engineer-correspondents . . . More than 1,000,000 executives, designers, production men and distributors use the editorial and advertising pages of these magazines to exchange ideas on war-production problems.

THE McGRAW-HILL BOOKS

Publishers of technical, engineering and business books for colleges, schools, and for business and industrial use.

McGRAW-HILL PUBLISHING COMPANY, Inc.
330 WEST 42nd STREET • NEW YORK

THE McGRAW-HILL NETWORK OF INDUSTRIAL PUBLICATIONS

American Machinist
Aviation
Bus Transportation
Business Week
Chemical & Metallurgical Engineering
Coal Age
Construction Methods
Electrical Contracting
Electrical Merchandising
Electrical West
Electrical World
Electronics
Engineering & Mining Journal
E. & M. J. Metal and Mineral Markets
Engineering News-Record
Factory Management & Maintenance
*FOOD INDUSTRIES—Shows how to Manage Production, Retain Nutrition and Appetite Appeal.
Mill Supplies
Power
Product Engineering
Textile World
Transit Journal
Wholesaler's Salesman

NEWS of the industry

ICKES TO PUSH PENDING RECLAMATION PROJECTS

Need for continued construction of irrigation and power projects in the West to meet war demands for food and electric energy in 1943 and later years was expressed by Abe Fortas, undersecretary of the interior, at the annual National Reclamation Assn. convention in Denver, Oct. 15. Fortas pledged that Secretary Ickes will continue to urge that Congress and the War Production Board make available money, materials and men to complete already started projects and to commence new ones which can be built within three years.

After reviewing the strides of reclamation work in recent years, Fortas warned that "splendid as is this record, there are signs that, unless vigorous action is taken, there will soon be shortages in food and fibre crops." He said that another 10,000,000 acres of tillable land will be needed in the next year or two, a substantial part of which must be in "the arid Western states."

"To do this," he continued, "we must have money, materials and manpower. In view of the known facts, I can say to you, upon the authority of the Secretary of the Interior, that the department proposes to urge upon the Bureau of the Budget and upon Congress, the necessity for the appropriation of funds to accelerate the completion of pending reclamation projects, and to begin new projects which can be completed in the next three years; that we propose to urge upon the War Production Board with all the vigor at our command that materials be produced and made available to enable these projects to be carried forward, taking into account, of course, the competing demands for materials for other war purposes. . . .

"The situation with respect to power developments which are an inseparable part of the reclamation projects is much the same. We are still faced with the prospect of power shortages in 1943 and thereafter if our war production program proceeds as it must. There again, we need money, materials and manpower to complete projects which are now under way, and to undertake new ones to provide for our needs in the later years when we may still be at war."

Along with the total public and private company plans for power expansion in the next three years, the Bureau of Reclamation's power program recently was curtailed by WPB. Since then, the bureau has urged reinstatement of the deferred projects—a subject now being studied by WPB.

JAPS RATION KWH.

A rationing of electricity which limits household use to 20 kwh. monthly was instituted in Japan on Oct. 1, according to an enemy broadcast from Berlin recorded by the government. In special cases where the consumer uses more than the maximum, the rate will be 50 yen (normally $13) for each additional kilowatt-hour, and in cases of continuous excess use current will be cut off, the broadcast said.

WLB Denies Utility Appeal In Union Negotiations

Denied an appeal from a NLRB ruling that it recognize the CIO Utility Workers Organizing Committee as the bargaining agency in its East Bay division, Pacific Gas and Electric Co. has been ordered by the War Labor Board to negotiate with the union. The company's appeal was based on the grounds that it should deal with employees on a system-wide basis rather than in individual divisions.

The situation is the outgrowth of an election held earlier in the year when outside employees chose between the CIO, the AFL Brotherhood of Electrical Workers or no union. The CIO won. Approximately 1,350 employees in Alameda and Contra Costa counties are affected.

In the meantime the NLRB ordered an election for the period Oct. 26-30 to be held in the company's Sacramento division. In this case the choice for the employees will be the same as in the previous contest: UWOC of the CIO, IBEW of the AFL or no union.

● First Concrete for the La Grande Dam of the second Nisqually electric power project for the city of Tacoma has been poured by the L. E. Dixon Co., contractors on the $14,000,000 development. There will be 94,000 cu. yd. of concrete in the main dam and about 10,000 cu. yd. in spillway, walls and other portions of the structure. The development, it is stated, will be furnishing power by October of next year.

COLORADO GROUP SEEKING CHANGE IN REA LAW

Colorado's next legislature will be asked to abrogate the present corporation law as it applies to Rural Electrification Administration projects and render such enterprises immune to supervision and control of the State Public Utilities Commission

This was the avowed purpose of the Colorado Electrification Assn., which convened in Denver, Oct. 19 to 21, expressed by the organization's leaders.

O. E. Gregory, president, asserted that rural electrification projects are handicapped by the corporation law restrictions. He pointed out that, under existing laws, business of an REA cooperative cannot be transacted unless 51% of the unit members are present; that under a "true cooperative set-up, 5% is sufficient for a quorum." Legislative measures calculated to eliminate this obstacle were drafted at the convention, under guidance of John E. Donahue, regional attorney for REA, and B. C. McLean, REA regional operations engineer, both from St. Louis, Mo.

Some 200 members of the electrification association, representing 19 Colorado groups, were present at the Denver meeting. Gregory, a Divide, Colo., rancher, declared: "The State Legislature must be convinced that we can raise our electrifiation, which now serves 50% of our rural population, to higher than 95%, as soon as we can get critical material to do the job."

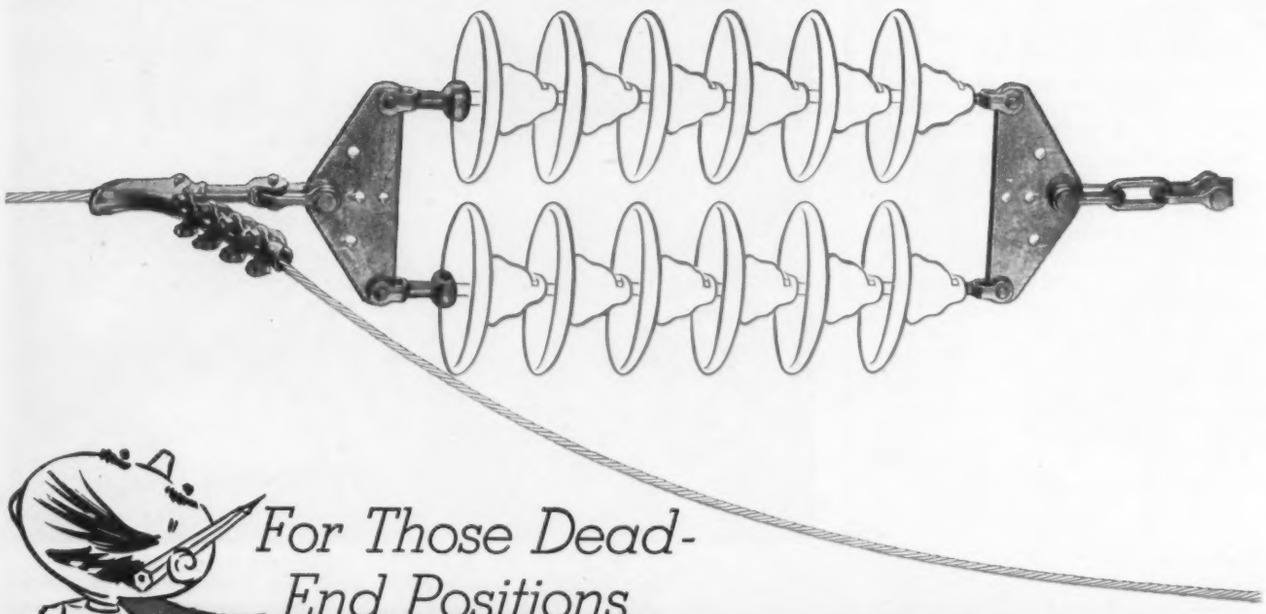
George A. Epperson, Fort Morgan, Colo., attorney for the association, reported 25,000 users of rural electricity in 61 of the state's 63 counties urge the adoption of the cooperative plan which cannot be operated at peak efficiency unless freed of the PUC restrictions that now prevail.

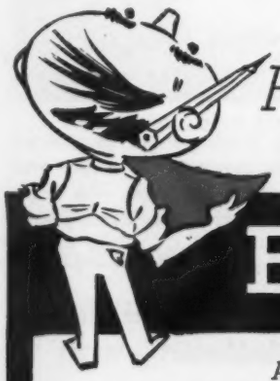
Under the proposed new law, it was stated, the ordinary utility-customer relationship would be eliminated and there would be no investors to protect because groups are financed by 25-year government loans.

Difficulties in the way of immediate expansion of REA projects in Colorado were acknowledged. The recent legislative conference, however, anticipated a swift program of action as soon as priorities release essential materials following termination of the war.

Strength of the organization is indicated by the fact that Denver and Kiowa counties, alone, do not belong to the Colorado Electrification Assn.

DESIGNING A TRANSMISSION LINE?





For Those Dead-End Positions

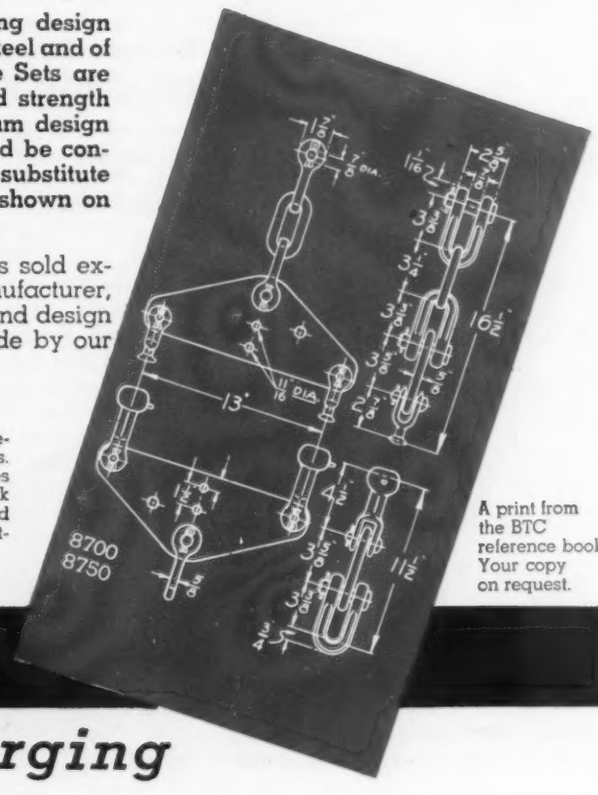
BTC Strain Yoke Sets

At some positions on all transmission lines it is generally necessary or desirable to dead-end the conductor by use of two or more insulator strings. As a rule, Double String Assemblies, either BTC Standard 36,000, or high-strength 50,000 pound ultimate will be found adequate. Pages 33 to 36 in the BTC reference book give detailed information and blue prints on Multiple String Strain Yoke Sets. The photographs of actual application will also be found interesting.

In selecting Yoke Sets or requesting design recommendations, full details of tower steel and of conductor strain clamps to which Yoke Sets are assembled, together with type, size and strength of conductor, type of insulator, maximum design loading and desired safety factor should be considered. It is sometimes necessary to substitute other shackles or connectors for those shown on standard assemblies.

Although BTC Hi-Line Hardware is sold exclusively through the insulator manufacturer, your strain yoke problems are invited and design recommendations will be promptly made by our own engineers.

BTC Yoke Plates offer a well balanced design with full radius round edges and corners. BTC Yoke Plates are die forged with all holes drilled and burred—not sheared from plate stock with punched holes. Plates may also be drilled for attachment of arcing or grading devices. Fittings are drop forged from Copper-Steel.



A print from the BTC reference book. Your copy on request.

THE BREWER-TITCHENER CORP.
Cortland, New York

Specify a BTC forging

RATE INCREASE "VETO" STRICKEN FROM BILL

By a last-minute decision of the conference committee, Senator George Norris' amendment to the anti-inflation bill to give the President (or OPA) authority to "veto" all utility rate increases was stricken from the measure before it went to the White House last month.

In place of the Norris amendment, the conferees inserted a new provision requiring that utilities and common carriers must give formal notice to the President 30 days in advance of the effective date of any general increase and specifically authorizing OPA to intervene before the regulatory body having jurisdiction. OPA has been intervening in all major rate increase cases so that the latter part of the new legislation simply provides statutory authority for something already being done without effective challenge.

Final determination on rate increases, under the conference committee language, remains with the state or federal regulatory agency having jurisdiction.

Substitution of this language for the Norris amendment, it is understood in Washington, came about largely because of the intervention of Chairman Joseph B. Eastman of the Interstate Commerce Commission. The ICC took the position that it did not want OPA set up as a "super" rate-making agency. Chairman Leland Olds of the Federal Power Commission and representatives of the National Assn. of Railway and Utility Commissioners also are reported to have voiced disapproval of the Norris plan.

Next step may be an attempt by Senator Norris to obtain Congressional consideration of his own bill amending the Price Control Act to replace the present "exemption" of utility rates with veto authority. This legislation was sidetracked during consideration of the anti-inflation measure when it appeared that the same end result could be accomplished in that bill.

Naval Reserve Commissions Are Open To Engineers

Naval reserve commissions are open to engineers in the civil, architectural and sanitary fields who have had experience in field construction work, according to an announcement from the San Francisco office of Naval Officer Procurement. Qualified men will be assigned important duties in connection with the expansion of all types of naval activities.

Actual experience in the construction of dams, power houses, bridges, piers, quaywalls, storehouses, air fields, railroads, cantonments, water and sewage disposal facilities is required of prospective engineer officers. The navy does not need design engineers or architects at this time.

Engineers who have a record of professional progress and experience in construction in a responsible capacity are invited to apply for an interview at the San Francisco office, 703 Market St.

Moonlight and artificial light combined to make this striking night picture of Grand Coulee Dam. Bright lights in windows of the west power house and illumination against the east end of the dam testify to night work. The engineers' model town is seen in the foreground. U. S. Bureau of Reclamation photo

Runaway Barrage Balloon Causes Havoc At Seattle

Antics of a runaway barrage balloon trailing a 1,000-ft. piece of steel cable, blacked out a section of Seattle, disrupted the trolley bus system and started a fire in a City Light substation last month.

The balloon cable tangled with a section of the city's high tension power lines and the resultant short circuit caused a fire on the 26-kv. bus at a nearby substation, damaging switches and conductors. The central part of the city was affected by the outage.

Some months ago a whole bevy of loose balloons flew from the Puget Sound region across the Canadian line, becoming entangled in power lines and temporarily disrupting service to a section of Vancouver.

● INITIAL 30,000-KW. unit at Parker Dam was given a preliminary test run early in October. Power production will begin in December. In the meantime the unit is being worked over for final adjustments.

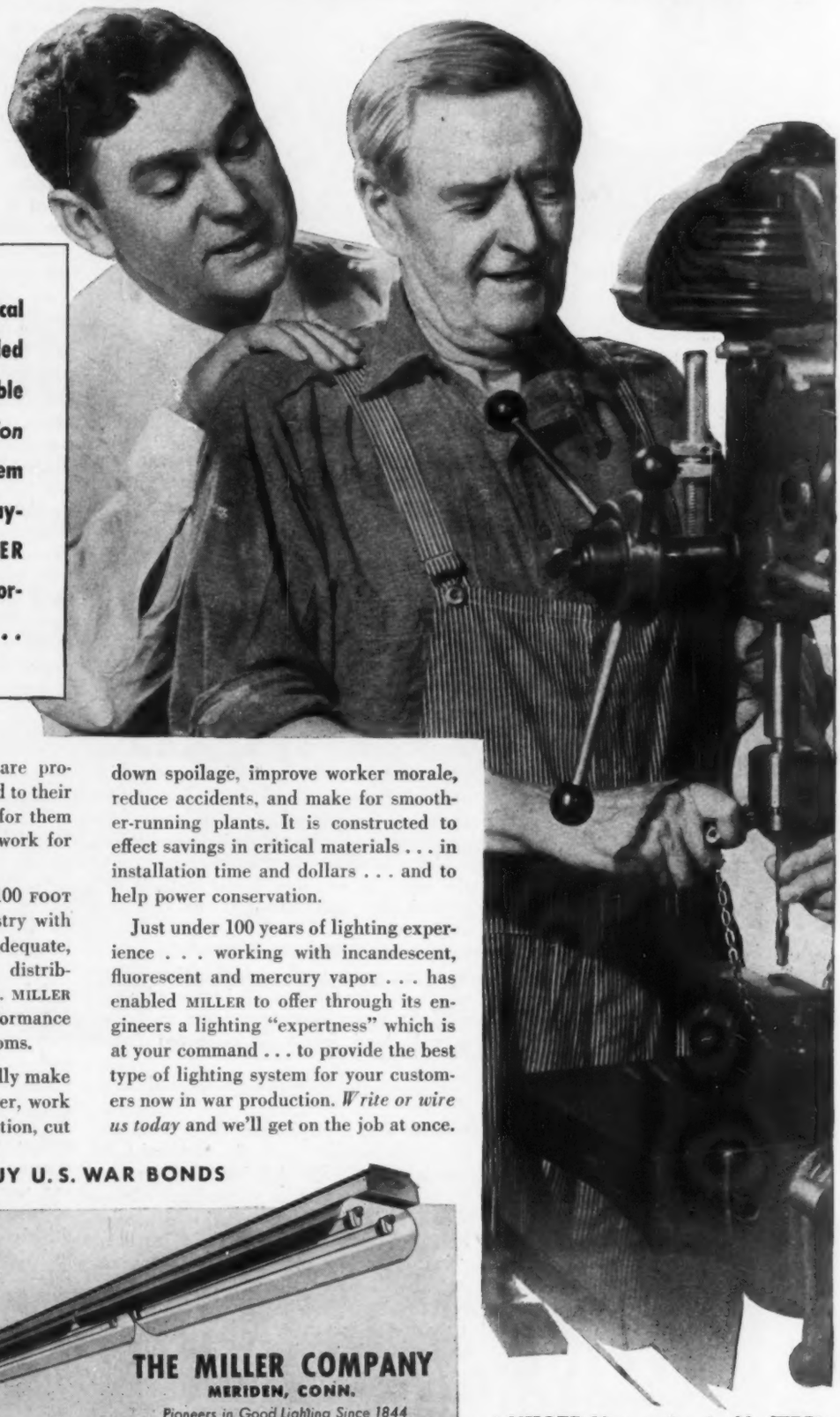
Silver Replacing Copper In Electrical Conductors

Twenty-four million pounds of copper have been saved in the last few months by substituting silver in electrical conductors, according to Harvey A. Anderson, chief of the conservation and substitution branch of WPB.

Copper is being replaced by silver in plants where electrical connections are a significant feature of production. Bus bars rated up to 3,000 amp. as well as transformer windings have been made of silver. A minimum of 34,000 tons of silver has been allotted by the Treasury Department to the Defense Plant Corp. and must be returned after the war. This silver is being loaned to those plants that must have large quantities for operation, that can conveniently protect the silver and that must be in almost constant operation. Only stipulation is that the silver be used for a non-consuming purpose.

● WOMEN at Victoria, B. C., are now being trained in marine electricity and electrical mechanics. Over 30 women are in a class conducted under the auspices of the Dominion-Provincial Training School. While there is no guarantee given at present that women who are graduated from the course will be given employment as electrical workers in shipyards no difficulties are anticipated in this regard as there is a steady demand for more and more such workers. The class is free.

"Gramp" YAEGER'S BACK ON THE JOB!



"Gramp" Yaeger's typical of the thousands of skilled old-timers in industry able to continue doing *precision* work . . . if you give them the kind of man-made daylight provided by MILLER *Continuous* Wireway Fluorescent Lighting System . . .

WPB says, "When old-timers are provided with good lighting, tailored to their needs, it is frequently possible for them to keep on doing the precision work for which they are fitted."

MILLER 50 FOOT CANDLER or 100 FOOT CANDLER will provide war industry with fine, man-made *daylight* . . . adequate, productive illumination evenly distributed over every working surface. MILLER TROFFERS will duplicate that performance in plant offices and drafting rooms.

This better lighting will actually make war workers see better, feel better, work better. It will help speed production, cut down spoilage, improve worker morale, reduce accidents, and make for smoother-running plants. It is constructed to effect savings in critical materials . . . in installation time and dollars . . . and to help power conservation.

Just under 100 years of lighting experience . . . working with incandescent, fluorescent and mercury vapor . . . has enabled MILLER to offer through its engineers a lighting "expertness" which is at your command . . . to provide the best type of lighting system for your customers now in war production. *Write or wire us today* and we'll get on the job at once.

BUY U. S. WAR BONDS

MILLER

50 FOOT CANDLER
100 FOOT CANDLER
MILLER TROFFERS
Continuous Wireway Fluorescent Lighting Systems

THE MILLER COMPANY
MERIDEN, CONN.
Pioneers in Good Lighting Since 1844

● MILLER offers a complete line of filament and fluorescent lighting equipment.

A MILLER Message inspired by WPB's helpful handbook, "Plant Efficiency."

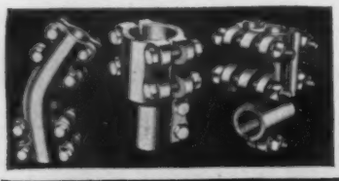
"When you need ANY Power Connector—

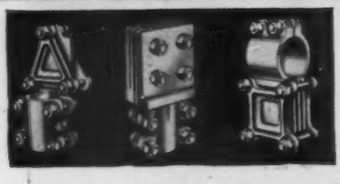
—see the COMPLETE line"

Probably the exact Power Connector you want is shown in the Penn-Union Catalog.

You will find Tee, Stud and End Connectors, Bus Supports, Terminals, Elbow and Cross Connectors, Couplers and Reducers—

—each in a wide range of sizes, up to the largest. Here are a few of the many types:





Also the most complete line of Cable Taps, Straight and Parallel Connectors, Lugs, Grounding Clamps—every good type.

KENNETH ANDERSON CO.
334 East 4th St., Los Angeles

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Penn-Union Electric Corp., Erie, Pa.

PENN-UNION
Conductor Fittings

HIGHER PRIORITY RATINGS SOUGHT FOR COULEE UNITS

Pressure is being exerted on the WPB as the result of Congressional complaints to the President, to improve the present A-2 priority ratings given the last three of nine Grand Coulee units authorized by Congress. The units were scheduled for 1944 installation.

In a letter to President Roosevelt, Senator Holman of Oregon pointed out that with the present allocation situation, an A-2 rating would not obtain critical materials. His statement was seconded by Bonneville Power Administrator Raver.

Facts On Electric Cooking Given to War Department

A detailed presentation showing that electric cooking requires less critical materials, less fuel and therefore less transportation than other forms of cooking has been presented to the army and other government war agencies in an effort to induce the War Department to reverse its recent ban on cooking electrically in new military posts.

The analysis was prepared by the Edison General Electric Appliance Co., Inc. It has been submitted to WPB Chairman Donald Nelson, Lt. Gen. Brehon Somervell, chief of the army's Services of Supply, Transportation Director Joseph Eastman, and others.

Chief exhibit is an independent study made by the Bonneville Power Administration showing that, on the basis of an actual army camp experience, electric cooking improves load factor within the demand factor which the army has specified for sizing electrical facilities.

Calculated for a 35,000-man camp, the study shows that 1.840 kwh. is required per man per day for lighting and power, 0.845 kwh. more for cooking, nearly 50%. Because of diversity, however, peak load—which shifts from afternoon to morning—is increased only a little more than one-fifth, and the overall load factor is improved from 63.5% to 75%.

Prewar published data showed that the army designed its camp distribution systems for a 60% demand factor, yet in the Bonneville study the demand factor is 40.9% for lighting and power, 24.2% after addition of cooking. Completely aside from the question of cooking, this phase of the study indicates a possible saving in materials in laying out distribution systems.

Other exhibits in the company presentation show that nearly 10 times as much coal is required for coal cooking as for electric, and that electrical appliances require only one-half as much critical metal as gas and one-third as much as oil.

The presentation was prepared as a direct result of a letter written by a WPB Conservation Division official last summer stating that "we agree that coal, wood and gas fire cooking equipment is more economical to strategic materials than electric cooking." It was as an outgrowth of this statement that the army closed the door to electric cooking in future camp construction.

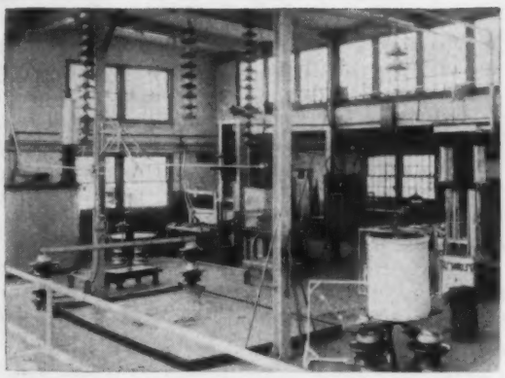
WPB's Conservation Division since, however, has retracted the early statement—after looking into the facts. Its position now, as enunciated by E. W. Roath, copper consultant, is that "we want to see the method of cooking used, for military use, which will require the least amount of critical materials for the particular application involved." This also is the position of the WPB power division.

● FOR YEARS AND YEARS, a copper cup originally intended as a membership trophy in contests between the San Francisco and Los Angeles Electric Clubs has gone unnoticed, used merely for a flower bowl in ELECTRICAL WEST's offices. Now the right to donate this metal to the scrap drive is being vigorously contested by both Los Angeles and San Francisco Clubs in an attendance contest covering seven meetings between Nov. 2 and Dec. 14, inclusive. Plentiful good humored publicity is expected to make the contest a hot one with attendance at each meeting checked against a percentage of the total membership and the tabulations sent by wire to each club before the end of each meeting. Outcome of this spectacular contest will be announced in the January issue of this magazine.

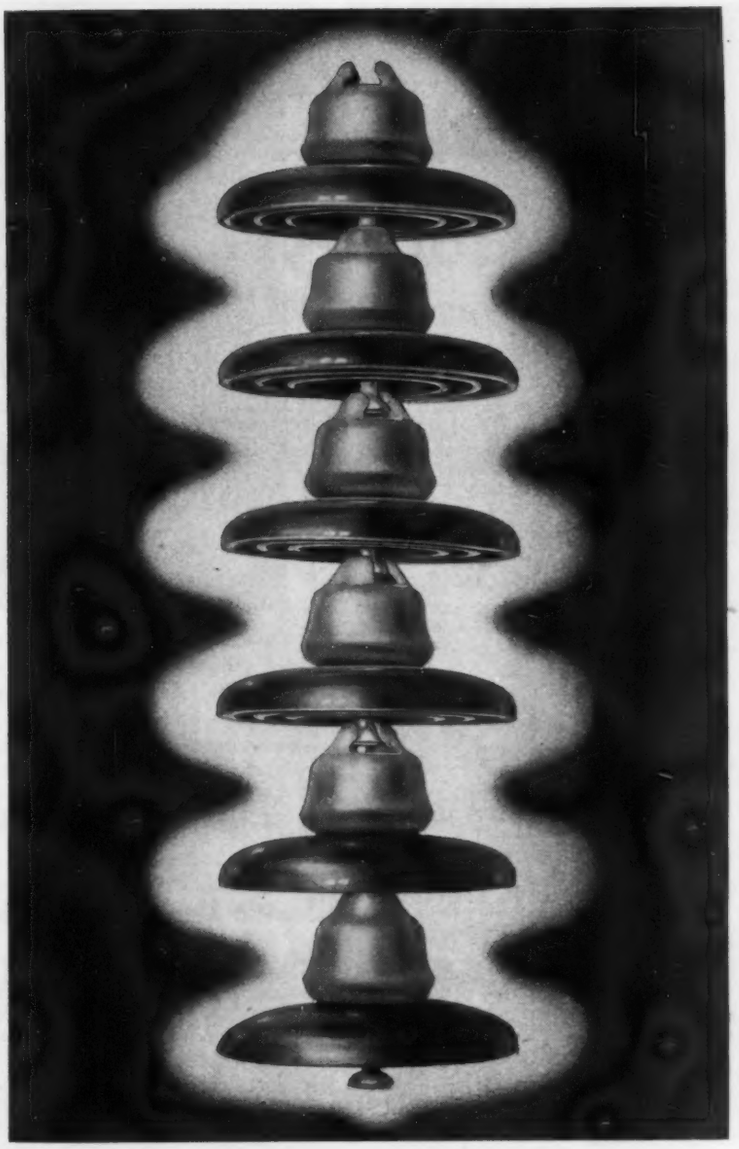
● A RESOURCE AND POWER load survey is being made by Pend Oreille and Stevens counties in Washington, according to A. B. Lind, president of the Public Ownership League of Washington. Information which may be useful in the present search for strategic war materials is being secured, Lind said. The survey is being made with the cooperation of the Bonneville Administration and is being checked monthly by that organization, it is reported.

● THE ARMY AND NAVY, in a joint action, recently placed a ban on voluntary enlistment of civilians whose leaving would impair efficient functioning of essential industries, including all utilities. Civilians in key executive or technical positions must obtain written release from their employers before they will be accepted for enlistment or given a commission. Civilians in essential industries whose jobs are outside the executive and technical categories must obtain a release from their Selective Service Board, if registered, and the employer may appeal the board's decision.

ENGINEERED *for* EFFICIENCY



This is the High Voltage and Mechanical Laboratory at Victor—fully equipped with all the latest Mechanical, Electrical and Ceramic testing devices including a new radio audibility circuit.*



● **Alert to the needs of a fast changing world, our Research staff, plus the watchful guidance of skilled ceramic and electrical engineers, have kept the efficiency* and durability of Insulators made at VICTOR out in front. That's the reason we are able to guarantee exceptional Insulators: "The best you can obtain ANYWHERE to give you safe, economical, lasting performance."**

***All Insulator data and characteristics shown in our catalog are based on the results of *Regular* and *Frequent* impartially conducted tests.**

THE MARK OF V GOOD INSULATORS

VICTOR INSULATORS INC.
VICTOR, NEW YORK

MAYDWELL & HARTZELL INCORPORATED

RELIABLE Connectors

Save Time

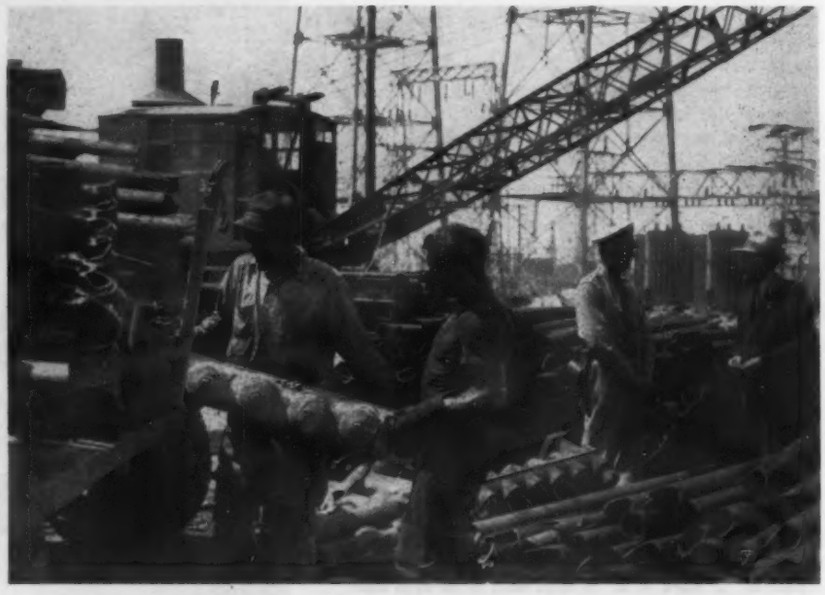
by using solderless connectors with accurately fitting precision threads which insure easy, permanent installations.

Save Copper

by using these connectors which are good as new after being salvaged.

EASY TO INSTALL
LOW IN COST

Reliable
ELECTRIC COMPANY
OVER 30 YEARS SERVICE TO THE UTILITIES
[illegible] CARROLL AVENUE - CHICAGO, ILLINOIS



Four hundred tons of scrap iron were added to the nation's stock pile as a result of a three-month round-up of absolete equipment at Southern California Edison Co.'s Long Beach Steam Station. Cast iron tubes and headers from four large economizers, unused for many years, were dismantled and routed into war production. Copper, brass and lead used in 52,000 sq. ft. of windows and skylights in the station went into the scrap when windows were replaced with concrete for protective purposes. Frames, rods and vents yielded about 55 tons of scrap metal and large amounts of salvage glass were realized.

Seattle Meets New Hurdles On Ross Dam Project

Seattle's project to increase the height of its Ross Dam, which has been an "on again, off again" proposition ever since it was instituted at WPB request last February, faced a new set of obstacles in October.

At last report a request was before the city council for appropriation of $65,000 to finance studies and investigations required by the Federal Power Commission. FPC has said that satisfactory performance of these tests is a prerequisite to approval of project plans and allowance of full reservoir pressure on the enlarged dam. Required are samples of concrete from the dam and rock from the foundation; a report on the future Skagit River hydro-electric development; a working model of the proposed new spillway and various analyses.

Another hurdle is a federal ruling that a concrete-cooling system must be included in the plans, necessitating an expenditure of $400,000 for strategic metals and materials. City Light officials point out that while concrete-cooling systems were installed in the larger masses of Grand Coulee, Boulder and Shasta dams, such systems never have been considered necessary on the smaller Skagit dams.

Meanwhile the city had been notified that an additional $1,864,760 had been granted, bringing the total funds available for the project to $10,164,760. The extra money is the result of a request to federal agencies after bids submitted Aug. 6 were found to be in excess of funds available. No definite date had been set for new bid proposals at last report.

● ABERDEEN AND HOQUIAM, (Wash.) PUD divisions will be consolidated and the billing department will move from Electric Park to the Aberdeen office, Manager Kelly Westrom has announced. Walter J. Anderson, Hoquiam branch office manager, has been named commercial manager of the system and will work out of the Aberdeen office. James M. Rogers, who has been Aberdeen division manager for two years, recently resigned to become auditor of the Port of Grays Harbor.

● NEW EXECUTIVE MANAGER of the National Rural Electric Cooperative Assn. with headquarters in Washington, D. C., is former Arkansas Congressman Clyde T. Ellis, who was recently defeated for nomination for the Senate. The NREC Assn. is seeking membership from the 800 REA co-ops by offering organized political leadership before government agencies in behalf of rural electrification.

TACOMA FACING POWER SHORTAGE THIS WINTER

Tacoma householders may experience a critical power shortage this winter, according to an announcement made by officials of the municipal power system. This city, which in past years has gained much publicity through its low electric rates, is now buying 60% of its current from outside sources, it was stated.

Tremendous increase in consumption by over-loaded defense plants is responsible for the grave situation. Power from Bonneville and the Coulee Dam inter-tie system is being brought into the city at present but no longer will be available when Pacific Northwest aluminum plants start full production, it was pointed out.

At Seattle, City Light Superintendent Eugene R. Hoffman reports that there is no indication of a serious power shortage this winter. The municipal system is purchasing 20% of its energy and Bonneville has given no indication that this outside power will be curtailed, he stated. As further insurance against a power shortage, City Light has its auxiliary steam plant on Lake Union, which it will start up when demands increase.

Commented Hoffman: "Tacoma's situation is different from ours. That city has large electro-chemical plants that require a tremendous amount of power. We have a few small plants of this type but not nearly the demand of Tacoma."

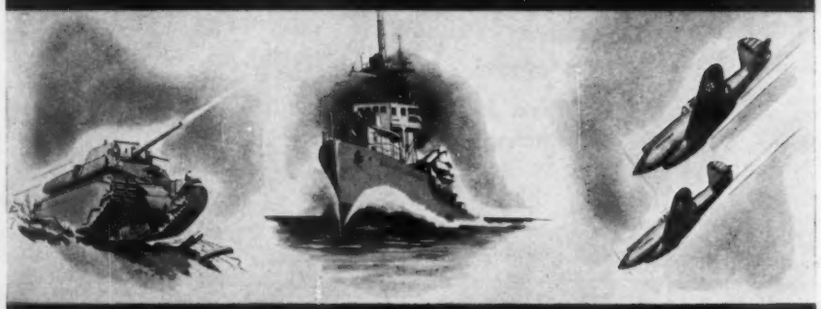
● SUIT FOR CONDEMNATION of Pacific Power & Light Co. properties in Klickitat county was filed in superior court last month by the local PUD. A resolution adopted by PUD commissioners authorizes issuance of up to $200,000 worth of revenue bonds to cover acquisition costs, extensions and additions.

● GRAY'S HARBOR PUD No. 1 has signed a new contract with the Bonneville Power Administration under the revised BPA rate schedule so as to secure a larger proportion of its energy at dump power rates. This will enable the district to make an overall saving in the cost of its power.

● WHAT IS BELIEVED to be a new world's record for hydro generators was established recently when one of the Grand Coulee 108,000-kw. units carried a peak of 129,000 kw. for an hour. Rated head is 330 ft. During the record run the head was 337 ft.

● APPROPRIATION of $26,000 from City Light funds to construct a substation in the vicinity of 29th Ave. N. and E. Madison St. is being studied by the Seattle City Council. Increased load in that area requires the additional facilities, it is stated.

CONTROLS THAT SERVE



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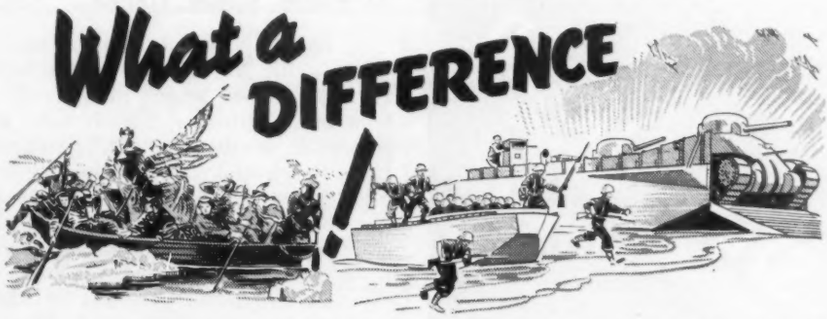

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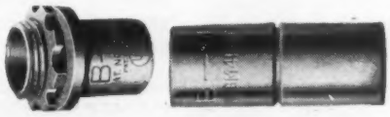

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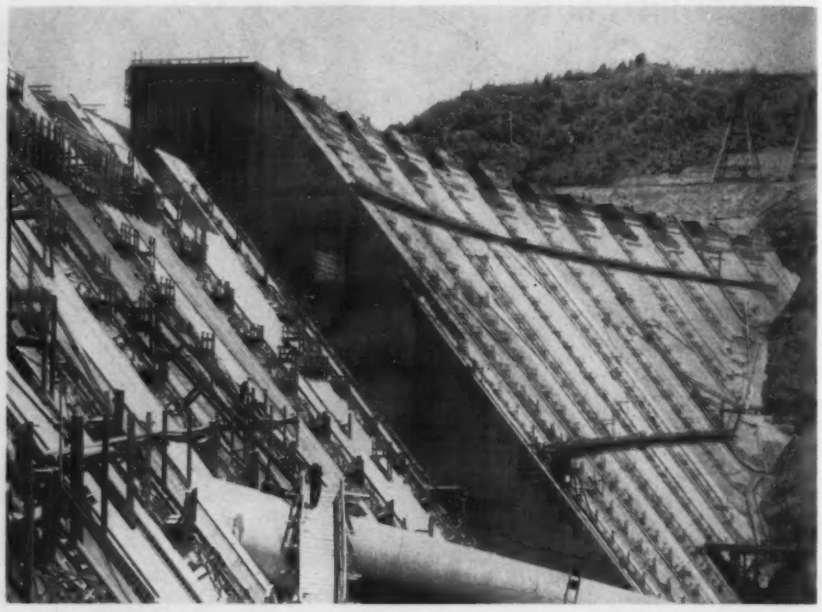

Concrete pouring operations at Shasta Dam, second largest concrete structure in the world, have passed the 4,000,000 cu. yd. mark. Above is the downstream face of the dam. Scaffolding serves to support water pipes and gives workmen access to cooling water headers. One of the 15-ft. penstocks is shown in the foreground, where it emerges from the dam. (USBR photograph)

Short Circuit Causes Fire At Edison Steam Station

A 66-kv. potential transformer, located in the No. 2 plant control house at Long Beach Steam Station of the Southern California Edison Co., and connected to the No. 10 Lighthipe—Long Beach 66-kv. line, failed at 6:30 p.m. Sunday, Sept. 20, and the resulting short circuit caused an explosion and fire. The explosion broke several doors and windows, and scattered oil over the switch compartment in which the transformer was located. The oil ignited and the fire caused some external damage to the 66-kv. No. 10 Lighthipe lower oil circuit breaker, and the smoke blackened several compartments in the west section of the control house. No one was injured.

Cause of the failure of the transformer is not known definitely because the explosion and fire damaged it to such an extent that no original evidence remained. It may have been due to a breakdown of the insulation in a bushing or in the winding, according to T. M. Hotchkiss, assistant superintendent of steam generation for the Edison Co.

The fire was brought under control by personnel on duty at the steam station and was virtually extinguished when apparatus from the Long Beach fire department arrived. Quick action was responsible for limiting the extent of the damage.

● FPC's REPORT of residential electric rates in the Pacific states as of Jan. 1, 1942 is now available. The report, which is in the form of typical net monthly bills, covers 1,294 communities with more than 250 population, served by 163 utilities. Regional reports on commercial and industrial rates will be published later.

● LEGALITY of a recent Oregon PUD election has been challenged in a taxpayer's suit filed against the Clatskanie People's Utility in the circuit court. Various charges are made in the suit to test the validity of the vote on $237,000 of revenue bonds which are to be used in the purchase of private utilities' facilities in the district.

● LOS ANGELES BUREAU of Power & Light has opened a new branch commercial office at 1712½ Sunset Blvd. The new office is the department's twenty-second branch office and the eleventh in the Los Angeles metropolitan area. Blase Beltramo, formerly of the Green Meadows office, is in charge. He is assisted by Don G. Witherell.

● LEWIS COUNTY PUD at Chehalis, Wash. has announced the purchase of the Morton electrical distribution system of the Washington Gas & Electric Co., at a price of $72,500. The necessary approval of the court will complete the negotiations, according to L. E. Scherer, president of the PUD.

TRADE notes

● A "T" EMBLEM has been added to the Pacific Electric Mfg. Corp.'s Minute Man Flag. The "T" Emblem appearing on the flag signifies that the total amount pledged for War Bonds amounts to 10% of the company's pay roll. This is an additional award to the one already given for having 90% of the employees signed up.

● SYLVANIA ELECTRIC PRODUCTS, INC., will be the new name of the lamp and lighting equipment manufacturer known for years as Hygrade Sylvania Corp. The trade name, Sylvania, will be used on all the company's products, the change being made as rapidly as consistent with economies of operation and conservation of materials. Sylvania-Pacific Co., under which the products were distributed in the West, will likewise change to the parent company name.

● LIGHTS, INC., prime contractor at Alhambra, Calif., has announced the appointment of Thomas F. Morrissey as director of planning and engineering and Victor G. Paradise as sales director. Morrissey formerly was assistant district manager of the Army Air Force Western Procurement District and Paradise is a former officer and director of Morrow Aircraft Corp., in California. Thayer Thorndike is president and Harry S. Kimball managing director of Lights, Inc.

● WESTINGHOUSE X-RAY DIVISION has opened a new showroom, service department and office at 450 Sutter St. in San Francisco. The office is open to the medical profession, according to Hugo J. Carlson, district manager for the X-Ray Division.

● BRYANT ELECTRIC CO., F. C. Scharr, Pacific Coast Manager, has moved from 325 Ninth St. to 525 Eighth St., San Francisco.

● BAILEY METER CO. has established branch offices at Los Angeles and Seattle, with L. F. Richardson in charge of the former and H. T. Sawyer of the latter. The two offices formerly functioned as part of the San Francisco branch.

MOVES

Central Electric Co. moved from 179 Minna St., San Francisco, to 610 Third St.

Coastal Sales Co., distributors of Lloyd Products, moved from 2795 16th St. to 2330 Market St., San Francisco.

Northern Light & Power Co. of Benbow, Calif., moved recently to Garberville, Calif.

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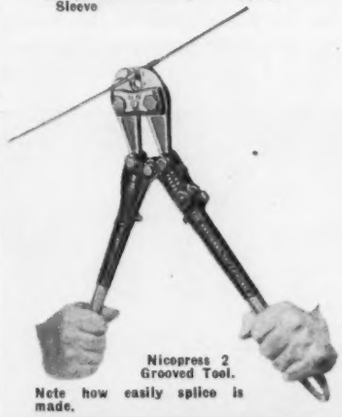

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PEOPLE
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Chanon, Mohler Transferred To Coast By G-E Division

General Electric Lamp Dept. has announced transfer of two men from its Nela Park headquarters to the West Coast. Henry J. Chanon, lighting engineer, has been assigned to the South Pacific Division in Los Angeles, and Don J. Mohler has been headquartered

Mohler Chanon

in Los Angeles to handle photolamp activities on the coast and in the Rocky Mountain area.

Chanon will specialize in the designing of lighting systems for maximum production and efficiencies in war industries, and will serve as blackout consultant in the region. For eight years a street and highway lighting expert in the Nela Park engineering department, he was instrumental in the design and installation of the famous Chagrin Falls, Ohio, high-visibility highway lighting system.

Mohler is a specialist on flash and flood photography and has given many lectures to army and navy divisions and others.

● R. E. JOHNSON has been appointed manager of the aviation division Industrial Dept. of General Electric Co.'s Pacific District, with headquarters at Los Angeles. With G-E since 1923, Johnson worked for the company in Schenectady, Chicago and the Pacific Northwest before going to Los Angeles in 1928.

● ERNEST KIPP, Westinghouse Electric & Mfg. Co., meter expert for many years, has joined the staff of the San Diego Gas & Electric Co., meter division, under William Talbott, as engineer for the department.

● DON PEARSON with General Electric Lamp Dept. as representative in Butte, Mont., for many years, has been transferred to Spokane.

Chamberlain Named By IAEL To Head Western Division

J. Clark Chamberlain, secretary-manager, San Diego Bureau of Radio and Electrical Appliances, was elected chairman of Division Four, International Assn. of Electrical Leagues at the recent Cleveland meeting. Division Four includes Arizona, California, Idaho, Nevada, Oregon, Utah and Washington.

As division chairman, Chamberlain automatically will become a member of the association's board of directors, when he takes office on Jan. 1. According to association officials, Chamberlain was elected "because his organization has done a fine job over a period of years for which Mr. Chamberlain has been largely responsible."

Chamberlain attended the conference at Cleveland Sept. 17-19 as Pacific Coast delegate.

Los Angeles Man Wins $2,700 In Lincoln Awards Program

Eric F. Bladholm, Los Angeles Bureau of Power & Light, won $2,700 and four other West Coast utility men took $100 awards in the $200,000 Industrial Progress Award Program, a 2½-year welding study sponsored nationally by the James F. Lincoln Arc Welding Foundation. The four were F. H. Roselle, shop foreman. Leonard Strom, welder, and L. H. Parker, electrical engineer, for the Turlock Irrigation District, Turlock, Calif. and Harold H. Lewis, designing engineer. Pasadena Municipal Light & Power Dept.

Bladholm is mechanical engineering associate, general plant division of the Los Angeles bureau. His subject was maintenance of hydraulic turbines for Los Angeles covering a four-year period.

● E. J. DOUGLAS, president of Enterprise Electric Works and a prominent electrical contractor of San Francisco for over 30 years, died Oct. 22 after a two months' illness. He has been president of Enterprise Electric Works during the past approximately 10 years and has served on the board of directors of the San Francisco Electrical Contractors Assn.

● JOHN KLENKE, Pacific Northwest district sales representative for General Electric Co.'s radio, television and electronics division since 1936, has been transferred to Schenectady. He will work on war production.

● HENRY B. MAY, JR., General Electric Co., has been returned to San Diego where he was formerly G-E representative. Of recent years he has been in the Los Angeles office.

George C. Tenney has been named president of McGraw-Hill Co. of California by the board of directors. He has been company vice-president for 10 years and editor of Electrical West since 1930.

● GUY W. FALLER completed his 40th year of service in the electric industry Oct. 13 and received congratulatory messages from friends all over the country. Faller, who has been president of the Public Service Co. of Colorado since 1934, started his career with the Madison (Wis.) Gas & Electric Co. in 1902 as operating engineer and superintendent of distribution. He joined the Denver Gas & Electric Co. in 1904 and except for ten years with the Amarillo (Texas) City Light and Water Co. has been connected with Denver utilities since.

● CLIFF HANSEN was appointed superintendent of buildings and grounds for San Diego Gas & Electric Co., a new job created. R. S. Porter formerly had charge of buildings and grounds as well as insurance for the company. He will now be superintendent of the insurance department. Increased needs for concentration of this activity, with its priority and many other complications, resulted in the new department.

● JAMES CARROLL, 65, founder and owner of the Carroll Electric, 525 Dunsmuir St., Vancouver, B. C., passed away recently. Mr. Carroll established his business in Vancouver 20 years ago. Ill health forced his retirement early in 1942.

● LT. COLONEL ARNOLD J. STEVENS, formerly Westinghouse sales engineer at San Francisco, spoke before the Commonwealth Club of California in that city Oct. 21. His subject was *Ordnance Department of U. S. Army.*

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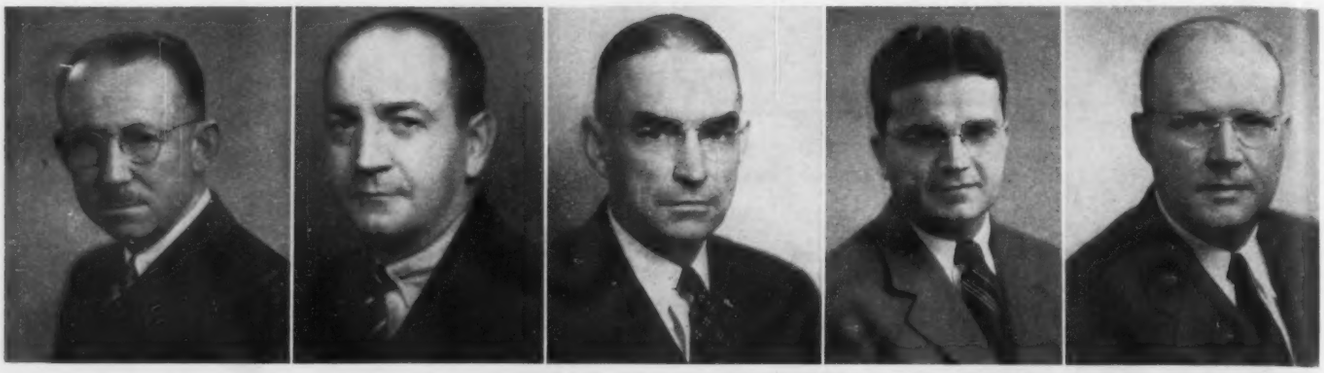

These five men were promoted recently by Puget Sound, Power & Light Co. at Seattle. Samuel S. MacFadden (extreme left) was advanced to executive vice-president. He had been a vice-president since 1930. Appointed vice-presidents the others are left to right: Patrick Johnson, Charles F. Terrell, Lawrence E. Karrer and Cecil Webb.

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Pole Top Resuscitation Saves Lineman's Life

Pole top resuscitation saved the life of Leland R. Schuessler, first class lineman, Southern California Edison Co., Redlands, on Sept. 14. Schuessler was working with J. S. Smith, first class lineman, and G. H. Fuller, apprentice lineman, preparing to transfer transformers and wires to a new pole. As he had not intended to work on energized equipment, he was not wearing rubber gloves. Accidentally he came in contact with an energized 4,000-volt circuit and fell free, hanging head downward from his safety strap. Smith and Fuller rushed to his assistance, placing him in a sitting position astride a crossarm. Smith applied artificial respiration by the pole top method, and in about two minutes the injured man began to breathe without assistance.

In the interim L. R. Edes, district clerk, had summoned medical aid, and a doctor and ambulance were waiting when Schuessler was lowered from the pole. He was taken to the Redlands Community Hospital, where he is making a satisfactory recovery.

Herbert M. Cooper, Veteran PG and E Employee, Dies

Herbert M. Cooper, veteran employee of Pacific Gas and Electric Co. and for many years manager of the Drum Division, died Oct. 5. He was associated with PG and E and its predecessors for 33 years previous to his retirement in 1938.

Mr. Cooper was born April 23, 1872 in Nevada County, Calif. and before entering the electric industry worked for his father at a sawmill located on the site of the present PG and E Deer Creek Power House.

In May, 1905 he went to work for the Bay County Power Co. at Nevada City on flume construction. He was made superintendent of the water district at Alta in 1907 and in 1910 was transferred to Auburn, Calif.

● W. N. LINDBLAD, who has succeeded Otto A. Knopp as chief of PG and E's Bureau of Tests and Inspections at Emeryville, Calif., has been with the organization since his graduation from college in 1913. Following a year in the meter department, he was transferred to the laboratory, where he has been since, with the exception of a year in the Aviation Corps during World War I.

● CITY COMMISSIONERS OF BREMERTON, Wash., have named A. Bryce, Bremerton electrician, as temporary electrical inspector.

● EARL G. WILSON, Napa, Calif. electrical equipment dealer has been named city deputy electrical inspector.

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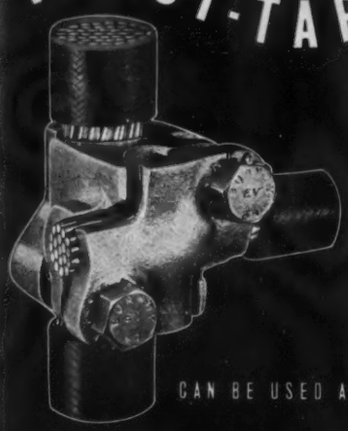

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Pittsfield, Mass.

With the Armed Forces

● G. Ross Henninger, former engineering editor of Electrical West and since 1933, editor of *Electrical Engineering*, the journal of the American Institute of Electrical Engineers, has been granted a leave of absence to accept a commission as lieutenant-colonel in the Army Specialist Corps. He is to serve as liaison officer on headquarters staff of the corps at Washington, D. C. Henninger joined the staff of *Journal of Electricity*, later Electrical West in 1924 following a year with the engineering department of Southern California Edison Co. after graduation from University of Southern California in 1922 and taking the student course at Westinghouse in East Pittsburgh.

● Lawrence King, of the Valley Electric Supply Co. and president of the San Joaquin Power Club, resigned in September to enlist in the army. He is stationed at San Francisco and is doing camouflage work. Frank Bittle has succeeded him as president of the power club. Bittle has been educational vice-president and treasurer.

● C. Allen Hart, for two years general counsel of the Bonneville Power Administration, has gone into the army and will be succeeded by C. Girard Davidson. Davidson, who has been assistant general counsel, formerly was attorney for TVA and for a time was consultant in the legal division of the U. S. Housing Authority.

● George W. Phillips, civilian head of the mechanical, electrical and ordnance engineering department of the U. S. Engineers' Albuquerque office, has been commissioned a major in the Army Specialists Corps with headquarters at Flagstaff, Ariz.

● P. W. (Jack) Price, vice-president and general manager of Victor Insulators, well known on the West Coast because of his frequent visits to this area, has been commissioned a lieutenant in the USNR.

● Charles P. Culbert, Pacific Coast manager of Proctor Electric Co., has been commissioned a captain in the Army Air Forces.

● Glenn L. Jackson, vice-president in charge of sales, California Orgon Power Co., is now a captain in the Army Air Corps.

● Lieut.-Com. J. S. Moulton, USNR, assistant executive engineer, Pacific Gas and Electric Co., has been called to active duty in the Navy's Civil Engineer Corps. For the present he will be stationed in San Francisco.

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PROFILES *of the month*

W. R. Battey, in charge of electrical engineering for Basic Magnesium at Las Vegas couldn't stay retired (he retired from Southern California Edison last year); was too modest to send his picture for the October issue

Eric F. Bladholm, Los Angeles, won $2,700 for his contribution to the Lincoln Award program. Story on Page 86.

Ben Hill (left) superintendent of Oakland Electrical Division, and George Kimball, electrical engineer, California Industrial Accident Commission, are members of the IAEI Executive Council. Below is James I. Dixon, past president

Chairman J. F. McAllister (right) and J. Vernon Sharp at Electrical League of Utah outing. One thousand attended.

Above right are members of the PCEA Guidance Committee: Charles Davies, San Diego Gas and Electric; A. D. Long, PG and E; and A. D. Bragg, General Electric Co.

J. R. Hedge, a member of the Sales Department of the San Francisco Division, is an Air Raid Warden in Redwood City where he resides.

They Serve!

No medals of honor, no thrills of martial adventure, no proud military rank . . . But still they serve, gloriously, the men and women who voluntarily are performing the civilian duties of their country's defense. ¶ We are proud of the 1400 P. G. and E. men who have given up their homes and jobs to face death on the battle fronts of the Seven Seas. And we are proud of this company's employees who by the thousands have enlisted in the unexciting, often arduous labors of air raid patrol and precaution, airplane observation, Red Cross, Canteen and Ambulance services and all the other activities in support of our armed forces. ¶ To them and to every member of the great Home Army is due the tribute of praise and recognition from their fellow Americans.

OUR CIVILIAN ROLL OF HONOR

Employees enlisted in defense activities:

Air raid wardens	771
Auxiliary firemen	277
Rescue squads	66
Auxiliary police	225
Bomb squads	26
Fire watchers	64
Airplane observation	411
Demolition crews	108
Other defense services	650
Red Cross services	1905
American Women's Volunteer Services	244
U. S. O.	141
Women's Ambulance and Transport	14
Other organizations	423
Total	5325

PACIFIC GAS AND ELECTRIC COMPANY

★ Helping win the war is the electrical industry's first job these days, and it is doing it with the concentration and skill which is typical of the industry's efforts. ★ Helping win the peace will be our next job . . . and today, in the midst of these busy, hurried days, we are looking ahead. The Planning Committee of the Pacific Coast Electrical Association is planning for the future, formulating courses of action to serve as guide-posts for meeting present and post-war conditions. The establishment of this committee is indicative of the long range planning which always has characterized the electrical industry—vision which always looks beyond a busy today and prepares for a promising tomorrow.

PACIFIC COAST ELECTRICAL ASSOCIATION

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